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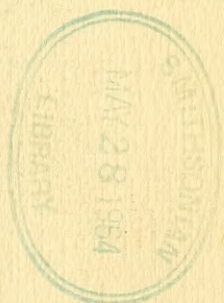
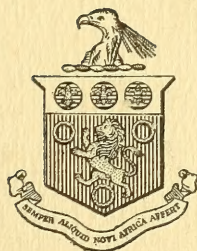
N. A. H. MILLARD

THE HYDROZOA OF THE SOUTH
AND WEST COASTS OF SOUTH AFRICA
PART II. THE LAFOEIDAE, SYNTHECIIDAE
AND SERTULARIIDAE

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THE HYDROZOA OF THE SOUTH AND WEST COASTS OF SOUTH AFRICA

PART II. THE LAFOEIDAE, SYNTHECIIDAE AND SERTULARIIDAE

By

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(With 16 figures in the text)

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INTRODUCTION

This paper represents the second part of a systematic account of the hydroids of the south and west coasts of South Africa. The first part, dealing with the Plumulariidae, appeared in these *Annals*, vol. 46, 1962. The scope of the work and the source of the material were detailed in the introduction to Part I, and need not be repeated here.

As before the details of the collecting stations are given in the station list which follows, and only the catalogue numbers are quoted in the systematic account. Occasional records which do not come from the south or west coast, but which have been mentioned for some special reason, have been put between brackets.

The author wishes to acknowledge the help of all those bodies or individuals who have helped materially or financially to build up the very extensive collection now present in the University of Cape Town, and also the South African Museum for access to the material dredged by the s.s. *Pieter Faure*. Acknowledgements are also due to the British Museum of Natural History for permission to examine material housed there, and to the Munich Museum for the loan of mounted slides.

Type specimens of new species have been deposited in the South African Museum and have been given a Museum registered number in addition to the University catalogue number.

The Trustees of the South African Museum acknowledge with thanks receipt of grants from the University of Cape Town and the Council for Scientific and Industrial Research towards the cost of publication.

STATION LIST

A. Littoral material from Oudekraal on the west coast of the Cape Peninsula.

Position: $33^{\circ}58'5''\text{S}/18^{\circ}22'2''\text{E}$.

	Date
A 123	15.3.34
A 381	25.8.34
A 382	13.5.34
A 384	25.8.34

AFR. Material dredged by the government research vessel, R.S. *Africana*.

	Date	Position	Depth (m.)	Bottom
AFR 736	17.8.47	$30^{\circ}42'4''\text{S}/15^{\circ}59'2''\text{E}$	201	co gn S, Sh
AFR 743	21.8.47	$30^{\circ}2'S/15^{\circ}2'E$	364	gn S
AFR 835	20.11.47	$35^{\circ}9'S/19^{\circ}2'E$	188	
AFR 866	9.1.48	$34^{\circ}36'8''\text{S}/19^{\circ}16'4''\text{E}$	38	S, R
AFR 945	19.3.48	$36^{\circ}25'S/21^{\circ}8'E$	177	S, R
AFR 1028.O	15.5.48	$28^{\circ}28'S/32^{\circ}25'8''\text{E}$	27	f S, R

B, BB. Littoral material from Lambert's Bay on the west coast. Position:

$32^{\circ}5'S/18^{\circ}14'E$.

	Date
B 105	28.7.38
B 114	29.7.38
B 137	31.7.38
BB 13	18.1.57

BMR. Bushman's River Estuary, on sand and muddy banks. Date: September, 1950. Position: $33^{\circ}41'S/26^{\circ}40'E$. Depth: $2-4\frac{1}{2}\text{m}$.

BRE. Breede River Estuary, littoral. Date: 7.7.51. Position: $34^{\circ}25'S/20^{\circ}51'5''\text{E}$.

CP. Littoral material from various localities on the west coast of the Cape Peninsula.

	Date	Locality	Position
CP 336	12.5.49	Oudekraal	$33^{\circ}58'5''\text{S}/18^{\circ}22'2''\text{E}$
CP 379	15.4.53	Sea Point	$33^{\circ}55'2''\text{S}/18^{\circ}22'6''\text{E}$
CP 650	1.2.61	Bakoven	$33^{\circ}57'6''\text{S}/18^{\circ}22'3''\text{E}$

CPR. Material from various localities in the Cape Province.

	Date	Locality	Position	Depth (m.)
CPR 7	15.1.50	The Haven	$32^{\circ}15'S/28^{\circ}57'E$	littoral
CPR 9	30.4.50	Glentana Strand	$34^{\circ}4'S/22^{\circ}20'E$	littoral
CPR 46	20.6.59	Umgazi Bay	$31^{\circ}43'S/29^{\circ}26'E$	27

E. Littoral material from Port Elizabeth on the south coast. Date: 9.7.36.

Position: $33^{\circ}56'S/25^{\circ}36'E$.

KNY. Knysna Estuary, on the south coast. Date: July, 1947. Position:

$34^{\circ}5'S/23^{\circ}4'E$ (average).

	Depth (m.)	Bottom
KNY 22	1-4	M
KNY 30	5-7	S, M
KNY 57	11.5	R
KNY 70	2-6	S
KNY 71	7	Sh, S, M

L. Littoral material from East London, on the south coast. Date: 10.7.37.

Position: $33^{\circ}1'S/27^{\circ}54'E$.

LAM. Dredged in Lambert's Bay, west coast.

	Date	Position	Depth (m.)	Bottom
LAM 2	16.1.57	$32^{\circ}4'5'S/18^{\circ}18'3'E$	17	S, R
LAM 7	18.1.57	$32^{\circ}5'S/18^{\circ}17'9'E$	23	R, Sh, S
LAM 9	17.1.57	$32^{\circ}4'7'S/18^{\circ}17'7'E$	23	S, Sh
LAM 13	19.1.57	$32^{\circ}4'S/18^{\circ}18'1'E$	18	R
LAM 14	18.1.57	$32^{\circ}5'S/18^{\circ}17'7'E$	17	S, Sh, R
LAM 18	18.1.57	$32^{\circ}4'8'S/18^{\circ}17'8'E$	17	R
LAM 23	17.1.57	$32^{\circ}4'1'S/18^{\circ}18'6'E$	15	S, Sh
LAM 30	19.1.57	$32^{\circ}5'1'S/18^{\circ}17'7'E$	20	R
LAM 35	19.1.57	$32^{\circ}5'5'S/18^{\circ}17'7'E$	27.5	R, Sh
LAM 40	19.1.57	$32^{\circ}5'5'S/18^{\circ}17'6'E$	28	S, Sh
LAM 41	21.1.57	$32^{\circ}5'S/18^{\circ}17'7'E$	20	S, Sh
LAM 45	21.1.57	$32^{\circ}5'S/18^{\circ}18'2'E$	8	S, R
LAM 46	22.1.57	$32^{\circ}4'4'S/18^{\circ}17'7'E$	23	R
LAM 59	23.1.57	$32^{\circ}9'S/18^{\circ}18'E$	16	S, R

LIZ. Dredged in Algoa Bay, Port Elizabeth, south coast.

	Date	Position	Depth (m.)	Bottom
LIZ 2	5.4.54	$33^{\circ}55'7'S/25^{\circ}37'2'E$	9.5	M
LIZ 7	6.4.54	$33^{\circ}58'1'S/25^{\circ}38'9'E$	9	St, R
LIZ 11	6.4.54	$33^{\circ}57'2'S/25^{\circ}38'E$	9.5	R, Clay
LIZ 13	6.4.54	$33^{\circ}58'2'S/25^{\circ}38'8'E$	7.5	S
LIZ 16	7.4.54	$33^{\circ}58'4'S/25^{\circ}40'5'E$	14	St
LIZ 27-40	11.4.54	$34^{\circ}0'8'S/25^{\circ}42'4'E$	6	R

MB. Dredged in Mossel Bay, south coast.

	Date	Position	Depth (m.)	Bottom
MB 8-12	12.1.56	$34^{\circ}4'3'S/22^{\circ}13'9'E$	19	R
MB 15	13.1.56	$34^{\circ}11'1'S/22^{\circ}10'1'E$	16	S, R
MB 24	13.1.56	$34^{\circ}11'1'S/22^{\circ}9'9'E$	19	R
MB 26	13.1.56	$34^{\circ}11'1'S/22^{\circ}10'1'E$	21	S
MB 39	16.1.56	$34^{\circ}10'1'S/22^{\circ}8'0'E$	9	R
MB 47	17.1.56	$34^{\circ}11'3'S/22^{\circ}10'0'E$	10	R
MB 52	17.1.56	$34^{\circ}11'0'S/22^{\circ}9'9'E$	14	R, S
MB 58	18.1.56	$34^{\circ}4'3'S/22^{\circ}13'5'E$	12.5	R
MB 59	18.1.56	$34^{\circ}4'1'S/22^{\circ}13'9'E$	11.5	R
MB 64	18.1.56	$34^{\circ}4'8'S/22^{\circ}13'1'E$	26	co S, Sh, R
MB 69	19.1.56	$34^{\circ}8'6'S/22^{\circ}7'3'E$	13.5	S, R
MB 72	19.1.56	$34^{\circ}9'1'S/22^{\circ}7'2'E$	12	R, S, Sh
MB 84	21.1.56	$34^{\circ}11'4'S/22^{\circ}10'1'E$	29	R
MB 88	18.1.56	$34^{\circ}4'8'S/22^{\circ}13'1'E$	26	co S, Sh, R

NAD. Dredged off Natal, east coast.

	Date	Position	Depth (m.)	Bottom
NAD 1	17.5.58	$30^{\circ}47'1'S/30^{\circ}29'1'E$	44	St
NAD 22	12.8.58	$29^{\circ}58'S/31^{\circ}2'E$	49	

PP. Littoral material from Paternoster, west coast. Date: 24.9.57. Position: $32^{\circ}43'S/17^{\circ}55'E$.

S. Littoral material from Still Bay, south coast. Date: 10.1.32. Position: $34^{\circ}23'S/21^{\circ}26'E$.

SAMH. Material from the South African Museum. Specimens 146–350 and 374–382 were dredged by the s.s. *Pieter Faure*. Their positions were given in the original records as compass bearings off salient points on the coast, and were probably not very accurate. These have been converted into latitude and longitude and are given to the nearest minute.

	Date	Position	Depth (m.)	Bottom
SAMH 146	23.6.1898	South of Mossel Bay		
SAMH 151–156	15.7.1898	34°8'S/22°16'E		St
SAMH 171–172	11.11.1898	33°49'S/25°56'E		
SAMH 173–178	19.11.1898	33°45'S/26°44'E	73–78.5	M
SAMH 181	22.12.1898	32°52'S/28°12'E		
SAMH 182–192	28.12.1898	33°9'S/28°3'E	86	S, Sh, R
SAMH 204–209	7.3.1899	33°59'S/25°51'E	24–27	
SAMH 213	24.3.1899	33°50'S/26°35'E	91	M
SAMH 216–220	19.6.1899	34°26'S/21°42'E		f S
SAMH 228–232	20.9.1899	34°15'S/22°10.5'E		M
SAMH 234–237	5.7.1900	34°27'S/20°58'E	51	CrI
SAMH 246	11.10.1900	34°8'S/22°59.5'E	73	S, Sh, CrI
SAMH 251–252	15.7.1901	33°13.5'S/27°58'E	89	brk Sh
SAMH 256–272	17.7.1901	33°7'S/27°47.5'E		f S
SAMH 281–282	25.7.1901	32°50'S/28°18.5'E	86	brk Sh
SAMH 288–294	13.8.1901	32°45'S/28°26'E	53	brk Sh, St
SAMH 295	13.8.1901	32°47'S/28°28'E	82	brk Sh
SAMH 301	15.8.1901	32°42'S/28°26'E	31	R
SAMH 310–314	10.9.1901	33°54'S/26°51'E	120	brk Sh, St
SAMH 316–318	23.9.1901	34°5'S/26°34'E	115	S, Sh, bk Spks
SAMH 321	19.2.1902	34°32'S/24°27.5'E	137	S, Sh, R
SAMH 325	22.9.1904	34°12'S/22°15.5'E	51	f S
SAMH 334	4.10.1904	34°12'S/22°15.5'E	51	f S
SAMH 348	19.10.1904	34°15.5'S/22°14'E	64	M
SAMH 350	22.8.1905	33°52'S/26°9'E		M
SAMH 358–359	19.6.1914	33°55'S/18°27'E		
SAMH 374–382	15.3.1899	33°47'S/26°19'E	18–29	S, Sh, St
SAMH 403	–4.1962	28°37'S/16°25'E	10–20	
SAMH 409	–10.1962	28°37'S/16°25'E	10–20	

SB. Saldanha Bay, west coast.

	Date	Position	Depth (m.)	Bottom
SB 150–168	–9.57	33°2.5'S/18°2'E	littoral	R
SB 194	1.5.59	33°3.5'S/17°59.2'E	20	R, S
SB 253	22.4.62	33°3'S/17°56.6'E	35	f kh S

SCD. Dredged off the south coast.

	Date	Position	Depth (m.)	Bottom
SCD 3	18.4.58	34°30'S/24°40'E	102	R
SCD 5	19.4.58	34°15'S/25°5'E	11	R, Sh
SCD 29	22.6.58	33°38.6'S/26°54.7'E	56	R
SCD 33	21.5.58	35°3'S/27°56.2'E	65	S, Sh
SCD 36–37	19.5.58	32°15.2'S/28°57.7'E	49.5	
SCD 50	18.5.58	31°38.8'S/29°34.4'E	33	R
SCD 52	20.8.58	34°1'S/25°45.5'E	46	R
SCD 56	19.8.58	33°37'S/26°56.6'E	46	
SCD 60	16.8.58	33°2'S/27°56.2'E	46	
SCD 61	15.8.58	32°17.7'S/28°54.5'E	49	
SCD 75	16.7.59	32°33'S/28°38'E	55	S, M
SCD 79	16.7.59	32°43'S/28°28'E	58	St, Sh

	<i>Date</i>	<i>Position</i>	<i>Depth (m.)</i>	<i>Bottom</i>
SCD 82	17.7.59	33°3'7'S/27°54'7'E	51	br S, Sh
SCD 84-85	17.7.59	33°3'S/27°55'E	27	R
SCD 94	20.7.59	33°55'5'S/25°51'E	46	bk M, S
SCD 96	20.7.59	34°21'S/25°41'E	110	Sh
SCD 101	21.7.59	34°33'S/24°1'E	131	R
SCD 103	22.7.59	35°7'S/22°15'E	119	S
SCD 104	23.7.59	34°33'S/21°28'E	67	co S, brk Sh
SCD 106	23.7.59	34°35'S/21°10'E	67	
SCD 108	23.7.59	34°35'S/21°11'E	75	co S, Sh, St
SCD 112	20.7.59	33°55'5'S/25°51'E	46	bk M, S
SCD 113	26.11.59	34°24'S/21°45'E	27	S, f Sh
SCD 114	26.11.59	34°29'S/21°49'5'E	73	gr-gn M
SCD 115	26.11.59	34°54'4'S/22°12'2'E	106	co S, Sh
SCD 117-118	14.2.60	34°24'S/21°46'E	18	R
SCD 119	14.2.60	34°33'S/21°52'E	77	kh S
SCD 122	14.2.60	34°40'5'S/22°0'E	93	kh S
SCD 126	3.6.60	34°26'5'S/21°48'E	67	bk M
SCD 138	28.8.60	34°35'S/21°56'E	77	co & f S
SCD 141	28.8.60	34°46'S/22°5'E	93	kh S
SCD 145	28.8.60	34°46'S/22°5'E	93	kh S
SCD 153-154	25.11.60	34°3'S/25°59'E	84	R
SCD 169	24.11.60	33°58'9'S/25°41'4'E	4-11	R
SCD 175	30.11.60	34°20'S/23°31'E	110	R, kh S
SCD 179	24.11.60	33°58'9'S/25°41'4'E	4-11	R
SCD 184	25.11.60	34°23'S/26°1'E	137	co S, brk Sh
SCD 191	29.11.60	34°4'3'S/23°25'8'E	47	gn M
SCD 206	30.11.60	34°51'S/23°41'E	182	kh S
SCD 219-239	29.11.60	34°2'S/23°28'4'E	49	S, R, M
SCD 250	30.11.60	34°48'S/23°39'E	148	R
SCD 254	16.7.61	33°7'3'S/28°1'E	88	CrI, R
SCD 258	14.7.61	33°53'8'S/25°42'5'E	32	f gr-bl S
SCD 265	14.7.61	33°48'S/25°47'E	27	bl M, R
SCD 276	14.7.61	33°53'8'S/25°42'5'E	32	f gr-bl S
SCD 284	6.2.62	33°1'S/27°55'E	7	f wh S
SCD 290	6.2.62	33°4'S/27°57'E	84	co S, Sh
SCD 296-297	6.2.62	33°9'S/28°2'E	84	
SCD 301	6.2.62	33°39'S/27°15'E	88	S
SCD 304-305	8.2.62	34°0'S/25°53'E	46	R
SCD 320-322	9.2.62	34°15'S/25°50'5'E	108	R, f S
SCD 324	9.2.62	34°27'S/25°57'E	172	M, S
SCD 330	11.2.62	34°3'5'S/23°23'E	11-18	f S
SCD 345	12.2.62	34°16'S/22°17'E	73	kh S, M
SCD 354	11.10.62	32°8'S/29°12'E	210	

TB. Material dredged from Table Bay, Cape Town.

	<i>Date</i>	<i>Position</i>	<i>Depth (m.)</i>	<i>Bottom</i>
TB 1	11.2.47	33°47'5'S/18°24'3'E	19-20	S, Sh, St
TB 10	11.2.47	33°50'5'S/18°25'8'E	27	R
TB 11	25.10.46	33°52'S/18°28'E	15.5	S
TB 12	11.2.47	33°47'5'S/18°24'E	19-20	Sh, St
TB 21	15.12.57	33°48'6'S/18°24'6'E	15	St, brk Sh, S

TRA. Material collected by commercial trawlers.

	<i>Date</i>	<i>Position</i>	<i>Depth (m.)</i>	<i>Bottom</i>
TRA 23	9.11.47	34°49'S/20°21'5'E	c. 91.5	
TRA 33	20.7.49	34°55'S/21°10'E	c. 90	S, R
TRA 35	21.1.50	34°34'S/20°50'E	70	M, S

		Date	Position	Depth (m.)	Bottom
TRA	37	-7.50	34°30'S/20°50'E	73	M, S
TRA	38	-7.50	34°30'S/20°56'E	73	M, S
TRA	42	-7.51	34°30'S/20°55'E	70	M, St
TRA	56	28.11.52	34°40'S/21°35'E	73	R, S
TRA	59	26.11.52	34°28'S/21°45'E	70	S, St
TRA	92	-1.54	35°3'S/21°50'E	110	S, R
TRA	151	6.3.58	34°51'S/19°55'E	22	R
TRA	156	15.10.58	34°12'S/18°22'E	18-27	Cable
TRA	159	6.7.58	33°56'S/25°36'E		Turtle

WCD. Dredged off west coast.

		Date	Position	Depth (m.)	Bottom
WCD	1	25.2.59	34°9'8"S/18°16'5"E	78	R
WCD	7	24.3.59	34°9'3"S/18°17'5"E	43	R
WCD	12	24.3.59	34°9'4"S/18°16'5"E	75	R
WCD	18	29.4.59	33°5'6"S/17°54'5"E	64	kh M
WCD	30	15.12.59	34°10'5"S/18°14'3"E	126	R
WCD	34	15.12.59	34°11'2"S/18°20'2"E	27	R
WCD	56	21.9.60	32°4'6"S/18°18'E	18	S, R
WCD	81	15.9.49	34°5'S/18°21'E	11	S
WCD	100	2.7.61	32°5'5"S/18°17'3"E	27	S, Sh

LIST OF SPECIES

Family **Lafocidae**

<i>Acryptolaria conferta</i> (Allman, 1877)	<i>Scandia mutabilis</i> (Richie, 1907)
<i>Filellum antarcticum</i> (Hartlaub, 1904)	<i>Zygophylax africana</i> Stechow, 1923
<i>Hebella furax</i> Millard, 1957	<i>Zygophylax armata</i> (Ritchie, 1907)
<i>Hebella scandens</i> (Bale, 1888)	<i>Zygophylax cornucopia</i> Millard, 1955
<i>Hebella urceolata</i> n. sp.	<i>Zygophylax enigmatica</i> n. sp.
<i>Lafocia fruticosa</i> M. Sars, 1851	<i>Zygophylax sibogae</i> Billard, 1918

Family **Syntheciidae**

<i>Hincksella cylindrica</i> (Bale, 1888)	<i>Synthecium ?elegans</i> Allman, 1872
<i>Synthecium dentigerum</i> Jarvis, 1922	<i>Synthecium hians</i> Millard, 1957

Family **Sertulariidae**

<i>Amphisbetia bidens</i> (Bale, 1884)	<i>Sertularella agulhensis</i> n. sp.
<i>Amphisbetia minima</i> (Thompson, 1879)	<i>Sertularella arbuscula</i> (Lamx., 1816)
<i>Amphisbetia operculata</i> (Linn., 1758)	<i>Sertularella capensis</i> Millard, 1957
<i>Craterithea acanthostoma</i> (Bale, 1882)	<i>Sertularella congregata</i> n. sp.
<i>Dictyocladium coactum</i> Stechow, 1923	<i>Sertularella dubia</i> Billard, 1907
<i>Diphasia tetraglochina</i> Billard, 1907	<i>Sertularella falsa</i> Millard, 1957
<i>Dynamena cornicina</i> McCrady, 1858	<i>Sertularella flabellum</i> (Allman, 1886)
<i>Dynamena crisioides</i> Lamx., 1824	<i>Sertularella fusiformis</i> (Hincks, 1861)
<i>Dynamena quadridentata</i> (Ell. & Sol., 1786)	<i>Sertularella gilchristi</i> n. sp.
<i>Salacia articulata</i> (Pallas, 1766)	<i>Sertularella goliathus</i> Stechow, 1923
<i>Salacia disjuncta</i> n. sp.	<i>Sertularella mediterranea</i> Hartlaub, 1901
<i>Sertularella africana</i> Stechow, 1919	<i>Sertularella megista</i> Stechow, 1923
	<i>Sertularella polyzonias</i> (Linn., 1758)

<i>Sertularella pulchra</i> Stechow, 1923	<i>Sertularia turbinata</i> (Lamx., 1816)
<i>Sertularella striata</i> Stechow, 1923	<i>Symplectoscyphus arboriformis</i> (Markt., 1890)
<i>Sertularella xantha</i> Stechow, 1923	<i>Symplectoscyphus macrogonus</i> (Trebb., 1928)
<i>Sertularia distans</i> (Lamx., 1816)	<i>Thyroscyphus aequalis</i> Warren, 1908
<i>Sertularia marginata</i> (Kirch., 1864)	

Family **Lafoeidae***Acryptolaria conferta conferta* (Allman, 1877)

Fig. 1 A-C, E

Cryptolaria conferta Allman, 1877: 17, pl 12 (figs. 6-10).*Acryptolaria conferta*: Totton, 1930: fig. 19a. Leloup, 1937: 29, fig. 19.*Records.* West coast: AFR 736Y. South Coast: SCD 101G.

Description. Colonies reaching a maximum height of 3.9 cm. Stem fascicled except for the terminal branches, but slender and flexible; branching in a roughly alternate manner and roughly in one plane, but on the whole very irregular in appearance.

Hydrotheca adnate to stem or branch for over half height; adcauline wall approximately straight and parallel with axis of stem in lower part of adnate section, curving outwards in upper part of adnate section and in free section; abcauline wall usually slightly convex opposite base of adcauline wall, curving evenly outwards beyond this; margin slightly everted. Base of adcauline wall of hydrotheca always above level of top of adnate part of the one below. Diameter at margin approximately $1\frac{1}{2}$ to $2\frac{1}{3}$ times that at base.

Free, solitary hydrothecae also present, arising separately from hydrorhiza or from epizootic stolons creeping over the surface of mature stems. These hydrothecae erect, at right angles to stolon, widening to margin which is slightly everted, quite symmetrical or (more often) somewhat irregular in shape.

No coppinae.

Measurements. See under subspecies *australis*.

Remarks. Both these colonies are growing on the surface of worm-tubes, and include stems in various stages of development. Certain observations on the method of growth were thus possible.

The hydrorhiza forms a branching reticulum giving off solitary hydrothecae and upright stems. In a young upright stem the first hydrotheca and the hydrocaulus arise separately and side by side from the hydrorhiza (fig. 1C). It appears thus that in the development of the colony a solitary hydrotheca is produced first, and that this is followed by the growth of a separate tube of the hydrorhiza past it, and in contact with it, to become the hydrocaulus of the stem. The development of the rest of the stem proceeds by a method of

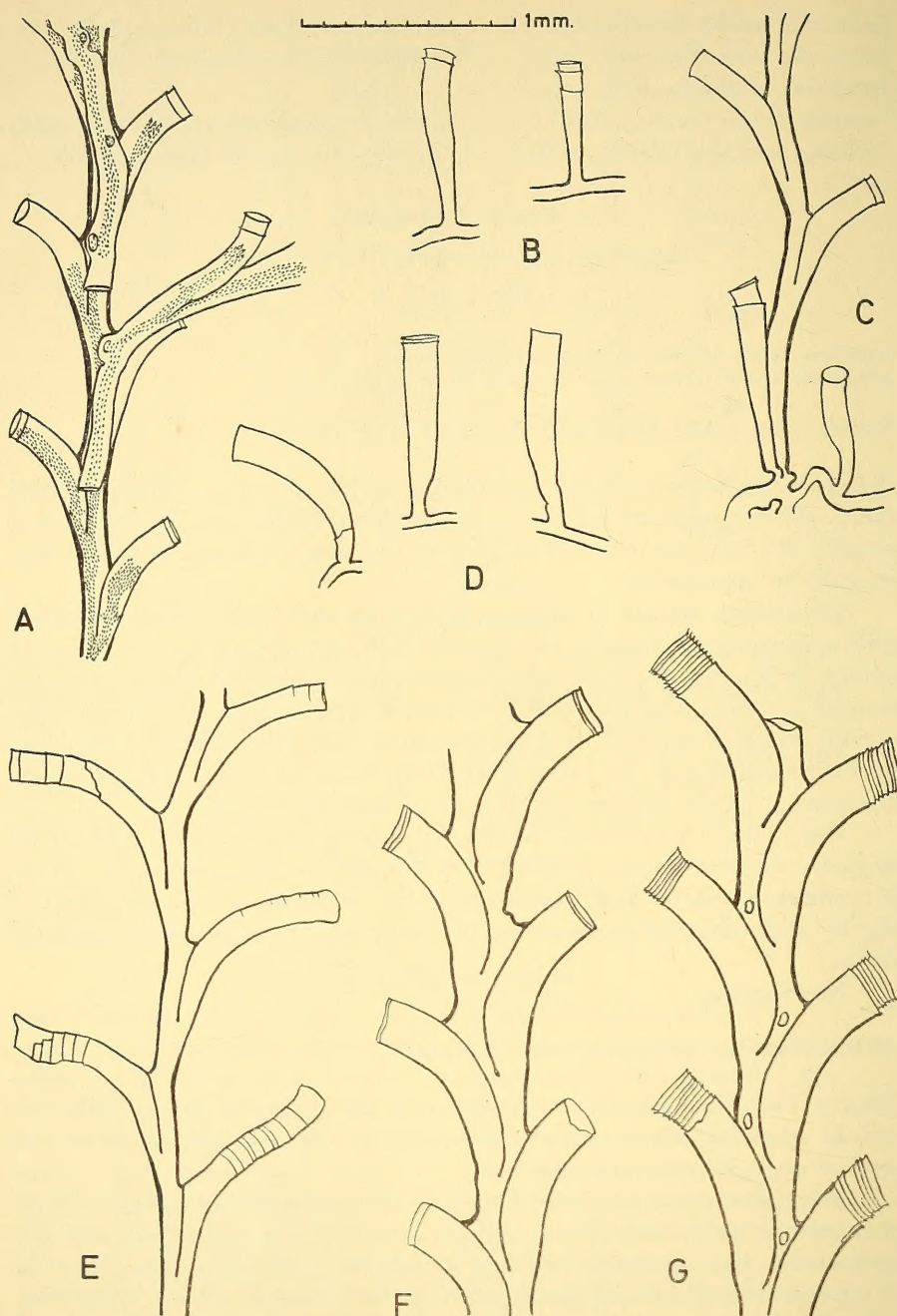


FIG. 1. *Acryptolaria conferta* (Allman).

- A. Part of the stem from AFR 736Y, to show branching. Portions of the peripheral tubes in position.
 B. Solitary hydrothecae from AFR 736Y.
 C. Solitary hydrotheca and young stem from AFR 736Y, to show origin.
 D. Subsp. *australis*, solitary hydrothecae from SCD 175N.
 E.-G. A few hydrothecae from SCD 101G, SCD 101F and SCD 175N respectively. The last two are included in subsp. *australis*.

sympodial growth. At a later stage the superficial tubes are developed as branches from the hydrocaulus arising opposite the top of the adnate part of the hydrothecae, and remaining in communication with it by a series of connexions in this position. Branches arise in the same position as the accessory tubes and are in cytoplasmic continuity with both the coenosarc of the stem and that of the accessory tube.

The free hydrothecae which are often present on the surface of older stems appear to belong mostly to young epizootic colonies growing on the surface of older ones.

These solitary hydrothecae are similar to those produced by various species of *Lafoea* (e.g. *L. dumosa* (Fleming), *L. gracillima* (Alder) and *L. fruticosa* M. Sars) and are almost identical with them. They also resemble hydrothecae of the creeping *L. tenellula* Allman, which is included by some authorities in *L. dumosa*. It is evident, thus, that extreme care should be taken in assigning such stolonial colonies to a particular species unless the branching form is present as well. For example, the *L. tenellula* described by Stechow in 1925 (p. 453, fig. 23) was growing on a colony of *Acryptolaria humilis* Allman and is probably the creeping form of that species.

The general appearance of the colonies described above resembles Allman's figure (pl. 12, fig. 6), and the shape of the hydrotheca resembles that illustrated by Totton (fig. 19a) from Madeira and by Leloup (fig. 19B) from French Indo-China. The measurements are in range of those quoted by most authors.

This is the first record of the species from South Africa.

Acryptolaria conferta australis Ritchie, 1911

Fig. 1D, F, G

Cryptolaria conferta var. *australis* Ritchie, 1911: 826, pl. 84 (fig. 2), pl. 87 (fig. 1).

Acryptolaria conferta var. *australis*: Totton, 1930: 163, fig. 19 c-e. Ralph, 1958: 315, fig. 4 a-g.

Records. South coast: AFR 835E. SCD 101F, 103F, 175N.

Description. Several colonies, the largest reaching a height of 11 cm. Stem fascicled, stiff and rather woody; branching alternate and always in one plane; branches variable in length, generally arising next to every third hydrotheca of the stem and often rebranching, those on the same side being separated by a distance of 3-4 mm. Branches often anastomosing.

Hydrotheca adnate to stem or branch for over half height; adcauline wall convex throughout; abcauline wall curved gracefully outwards, the curvature being more marked in the distal half. Hydrothecae overlapping, with base of adcauline wall always below level of top of adnate part of the hydrotheca below. Diameter at margin approximately $1\frac{1}{2}$ to $2\frac{1}{4}$ times that at base.

Free hydrothecae also present in SCD 175N, arising from epizootic stolons.

No coppiniae.

Measurements (mm.)	<i>A. conferta australis</i>		<i>A. conferta conferta</i>	
	AFR 835E	SCD 175N	AFR 736Y	SCD 101G
Hydrotheca, length adcauline, adnate				
part	0.75-0.95	0.67-0.85	0.37-0.49	0.33-0.45
*length adcauline, free part ..	0.20-0.72	0.27-0.55	0.24-0.55	0.12-0.75
diameter at base	0.11-0.13	0.11-0.14	0.065-0.10	0.06-0.09
diameter at margin	0.19-0.23	0.23-0.26	0.135-0.16	0.13-0.15
diameter, margin/base	1.54-1.92	1.64-2.18	1.40-2.29	1.67-2.33
Solitary hydrotheca,† length ..		0.71-1.27	0.43-0.82	0.57-0.61
diameter at margin		0.16-0.20	0.115-0.15	0.12-0.15

*Including rejuvenated margins.

†Without rejuvenated margins.

Remarks. This material shows the distinctive characters of subspecies *australis*, namely the overlapping hydrothecae and the characteristic thecal shape. It differs markedly from the material which has been assigned to the nominal subspecies in its growth-form, which is stiffer and more regular, and in the measurements of its component parts, which are larger, though the proportions are similar. Neither of the last two characters are necessarily of systematic value, but it is difficult to assess the variability until more material is available.

Filellum antarcticum (Hartlaub, 1904)

Filellum ?antarcticum: Millard, 1958: 175.

Records. South coast: ?AFR 835Z. MB 69C. ?SCD 175R.

Description. The second sample, growing on a polyzoan, bears the remains of a coppinia in a somewhat dilapidated condition. However, the accessory tubes are clearly visible; they are usually forked at the end (in one case twice), occasionally simply truncated, but never curved as in *F. serpens*. The other samples bear no coppiniae.

Measurements (mm., in MB 69C).

Hydrotheca, length of free part, without reduplications	0.18-0.30
diameter at margin	0.10-0.12

Remarks. The structure of the accessory coppinial tubes in MB 69C establishes with certainty the presence of this species in South Africa for the first time. The identity of unfertile samples is doubtful. Stechow (1925, p. 458) has reported the presence of the closely related *F. serpens* in South Africa, but since his specimens were unfertile, these records are also subject to doubt.

Hebella furax Millard, 1957

Fig. 2B-D

Hebella furax Millard, 1957: 200, fig. 8.

Records. South coast: MB 15B, 24T, 26E, 39W, 47K, 72G. SAMH 256, 301. SCD 37U, 84Z, 117R, 179B.

Description. Colonies epizootic on *Lytocarpus filamentosus* (Lamarck), *Thecocarpus*

formosus (Busk) and *T. flexuosus solidus* Millard. Very few parasitic hydrothecae present among these samples.

Hydrothecae similar to those previously described, though a few are a little shorter and thus the proportion of length/diameter is less.

Gonothecae (described for the first time) borne on hydrorhiza, not sharply demarcated from pedicel, widening towards distal end, often curved towards one side, with smooth or slightly corrugated walls. Pedicel with 2-5 spiral annulations. Containing several medusa-buds in various stages of development. The young gonotheca is closed distally by a slightly convex operculum, which tends to crumple in microscopic preparations, but has no valves. In the ripe gonotheca the operculum is absent and the margin usually everted.

Oldest medusa about 0.4 mm. deep and 0.25 mm. wide, with at least 2 long, spirally coiled, marginal tentacles and a 4-lipped mouth.

Length of gonotheca, including pedicel	..	..	..	1.64-2.52 mm.
maximum diameter	..	..	..	0.50-0.81 mm.

Remarks. The examination of numerous samples of this species shows that the epizootic form is far more common than the parasitic one. It is possible that *H. furax* is conspecific with *H. parasitica* (Ciamician), but the gonophores of the latter have not so far been described.

Hebella scandens (Bale, 1888)

Hebella scandens: Millard, 1957: 202. Millard, 1958: 176. Vervoort, 1959: 237, fig. 12.

Hebella calcarata: Ralph, 1958: 306, fig. 1 a-s.

Records. West coast: WCD 18V, 34K. South coast: MB 8M, 64M. SAMH 183, 229, 237, 289, 382. SCD 37T, 52T, 75F, 79Q, 84Y, 108H, 118L, 154J, 175M, 179A. TRA 92R, 151H.

Hebella urceolata n. sp.

Fig. 2A

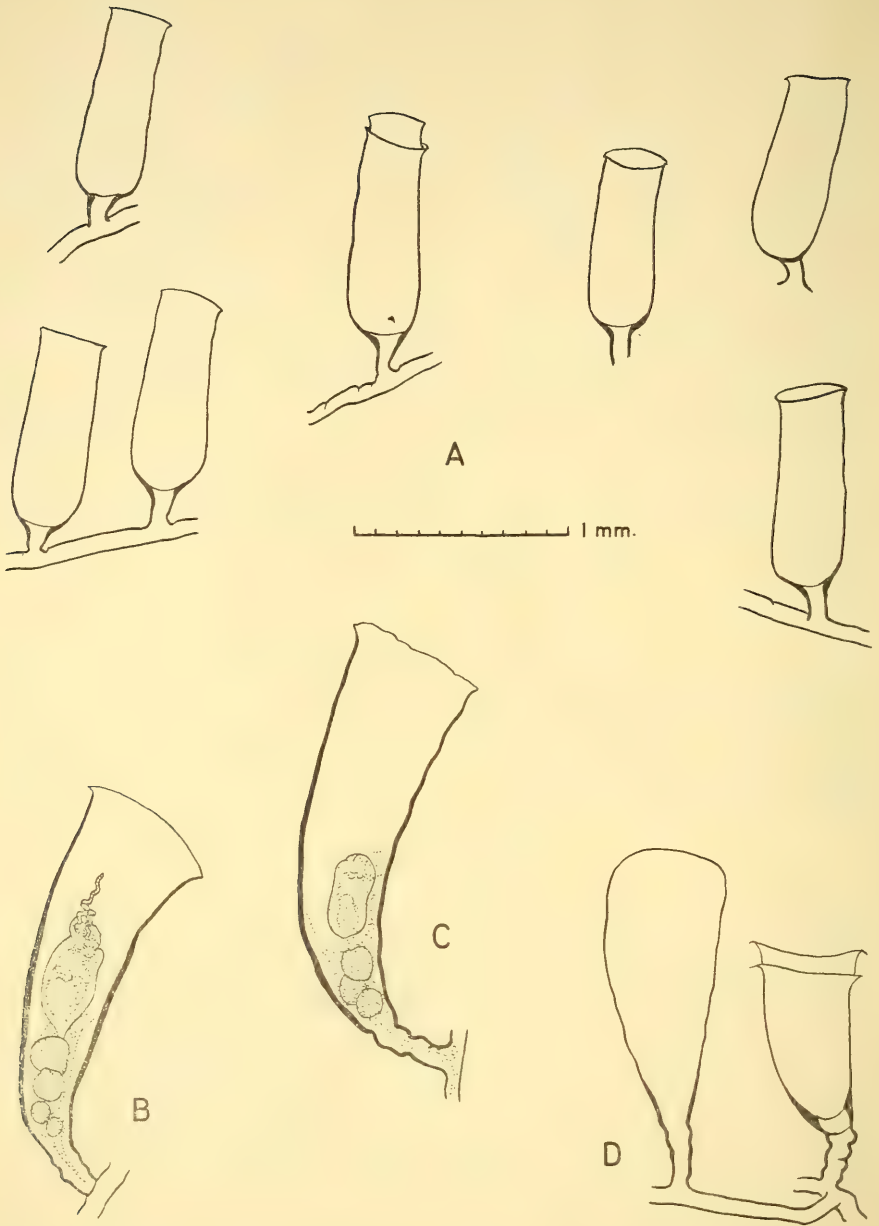
Holotype: SCD 154H (South African Museum registered number, SAMH 410).

Description. Colony epizootic on *Halecium beani* (Johnston). Hydrorhiza unsegmented, giving rise to hydrothecal pedicels at irregular intervals.

Hydrotheca about three times as long as wide, distinctly demarcated from pedicel, gibbous below and narrowing above to just below margin. Margin smooth, everted, straight or slightly oblique, sometimes rejuvenated. Pedicel short, not annulated, widening distally. Hydrotheca separated from pedicel by an annular thickening of the wall, to the distal region of which is affixed a delicate diaphragm.

Most hydrothecae show a tendency to be asymmetrical with the margin more strongly everted and the basal region more gibbous on the surface directed towards the distal end of the host colony, while the annular thecal thickening is more strongly developed on the opposite side.

Gonophores absent.

FIG. 2. *Hebella* spp.A. *Hebella urceolata* n. sp. Various hydrothecae from the holotype.B.-D. *Hebella furax* Millard. B and C, gonothecae containing young medusae from SCD 84Z.

D, a young gonothecha and a hydrotheca from MB 72G.

Measurements (mm.)

Hydrorhiza, diameter	..	..	..	..	..	..	0.07-0.10
Pedicle, height, to diaphragm	..	..	..	..	..	..	0.11-0.17
Hydrotheca, height, from diaphragm	..	..	..	..	..	..	0.81-0.93
diameter, near base	..	..	..	..	..	..	0.31-0.35
diameter, at margin	..	..	..	..	..	..	0.25-0.33

Lafoea fruticosa M. Sars, 1851

Fig. 3

Lafoea fruticosa: Allman, 1888: 34, pl. 16 (fig. 2, 2a). Broch, 1918: 12. Stechow, 1925: 456, fig. 24B. Totton, 1930: 157, fig. 13. Fraser, 1944: 223, pl. 46 (fig. 206). Vervoort, 1946: 201, fig. 83 c, d.

Records. West coast: WCD 1L. South coast: SCD 175Q.

Description. Branching colonies reaching a maximum height of 9.0 cm. Stems fascicled, branching mainly in one plane but growing together in clusters and anastomosing with each other to produce a shrubby effect.

Hydrothecae arising from all sides of the stem and branches, forming an angle of about 40-60° with branch. Asymmetrical in shape, generally with a double curvature on the adcauline side and a more or less straight abcauline wall. Margin slightly everted. Pedicel short and slightly twisted.

An epizootic colony present on the surface of WCD 1L, giving rise to upright stems and solitary hydrothecae. The latter generally more slender and with thinner perisarc than those borne by upright stems.

Coppinia present in WCD 1L, consisting of closely packed, more-or-less hexagonal gonothecae surmounted by acrocysts, which are loosely attached and come away easily on handling. Gonotheca approximately 0.4 mm. in height and 0.15 mm. in diameter at the shoulder, with a short mouth-funnel of approximately 0.05 mm. in height and 0.05 mm. in diameter at the everted margin. Tubular hydrothecae long (well over 3 mm.) and much coiled.

Measurements (mm.)

						WCD 1L	SCD 175Q
Pedicel, height	..	..	..	..	..	0.10-0.19	0.14-0.22
Hydrotheca, height	..	..	..	..	..	0.42-0.66	0.34-0.59
Pedicel + hydrotheca, height	..	..	..	..	..	0.52-0.77	0.46-0.77
Hydrotheca, diameter at margin	..	..	..	..	..	0.14-0.19	0.14-0.16
Height of hydrotheca + pedicel							
diameter at margin	..	..	..	..	..	3.555-5.03	3.29-4.97
Hydrotheca height/pedicel height	..	..	..	..	..	2.63-6.00	1.55-3.28
Solitary hydrotheca + pedicel, height	..	..	..	..	..	0.41-0.73	
diameter at margin	..	..	..	..	..	0.10-0.14	

Remarks. It was difficult to assign this material to a species, as it has features which resemble both *L. fruticosa* and *L. dumosa*. It has been assigned to the former partly because of the appearance of the coppinia, which resembles that illus-

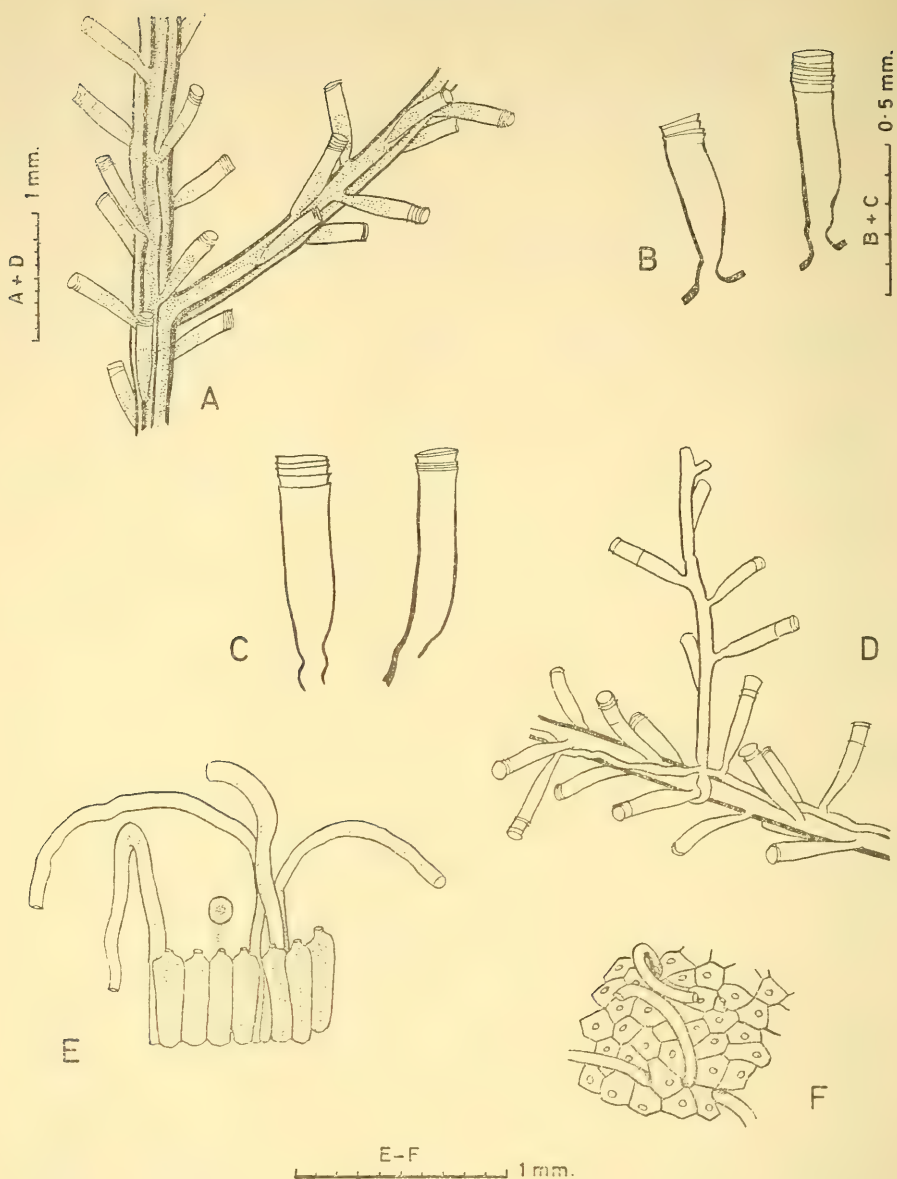


FIG. 3. *Lafoea fruticosa* M. Sars.

A. Part of a fascicled stem, to show branching.

B and C. Hydrothecae.

D. An epizootic colony with solitary hydrothecae and an upright stem growing on the surface of an older colony.

E. Part of a section through a coppinia, showing gonothecae (one with an acrocyte) and tubular hydrothecae.

F. Surface view of part of a coppinia.

(A and B from SCD 175Q, C-F from WCD 1L.)

trated by Fraser and Vervoort, and partly because of the shape of the hydrotheca, which resembles more that illustrated by Stechow, who has described both species from South Africa. The shape and proportions of the hydrotheca are intermediate between those described and illustrated by Totton for *L. dumosa* and *L. fruticosa*.

Since the branches arise from the accessory tubes in this species it is often difficult to distinguish epizootic colonies from the accessory tubes and branches. However, the accessory tubes always run strictly parallel to the axial tube and are in cytoplasmic connexion with the coenosarc of the latter, whereas the epizootic hydrorhiza wanders at will over the surface of the stem, with which it has no communication, and gives off both upright stems and solitary hydrothecae.

Scandia mutabilis (Ritchie, 1907)

Scandia mutabilis: Millard, 1957: 202. Millard, 1958: 176.

Records. South coast: KNY 30U.

Zygophylax africana Stechow, 1923

Fig. 4A-F

Zygophylax africana: Stechow, 1925: 445, fig. 18.

Records. West coast: AFR 743H. South Coast: SAMH 321.

Description. Hydrorhiza growing over the surface of worm-tubes, bearing nematothecae, solitary hydrothecae and upright stems in all stages of development, the latter reaching a maximum height of 9.5 cm. Stem and main branches thickly fascicled with some of the accompanying tubes extending on to the basal part of practically all the smaller branches. Stem bearing alternate hydrothecae and alternate branches given off at the base of every third and fourth hydrotheca. Branches often rebranching in the same manner, or according to a different scheme in which subbranches arise at the base of every third hydrotheca alternately to the right and the left. The hydrotheca at the origin of each branch is not strictly in the axil but shifted slightly onto the branch itself. All branches in one plane, many of the larger ones anastomosing with other parts of the colony.

Smaller branches (Stechow's 'cladia') unsegmented, but often with one or two corrugations close to the base; bearing alternate hydrothecae, of which the two rows are in one plane.

Hydrothecal pedicel short (and covered by the accompanying tubes on the thick part of the stem), sometimes with a distinct indentation on the adcauline side. Hydrotheca long, tubular, curved away from branch, of equal diameter throughout from just above the level of the diaphragm (SAMH 321, fig. 4F), or widening slightly towards margin (AFR 743H, fig. 4E). Margin slightly everted. Hydrotheca set at a varying angle to stem or branch—the angle may be as large as 50° (more common in AFR 743H), or very small so that the

adcauline wall is almost in contact with the axial tube (more common in SAMH 321). Diaphragm in form of annular thickening, set obliquely, with adcauline side lower than abcauline.

Nematotheca tubular and of equal diameter throughout, borne on a very short and narrow pedicel, and separated from it by a delicate diaphragm. Nematothecae borne irregularly on the peripheral tubes of the stem, and one on the base of each hydrothecal pedicel. The nematotheca of the first hydrotheca of a branch, however, is situated on the branch itself immediately beyond the hydrotheca instead of on its pedicel. Both hydrothecae and nematothecae often with reduplicated margins.

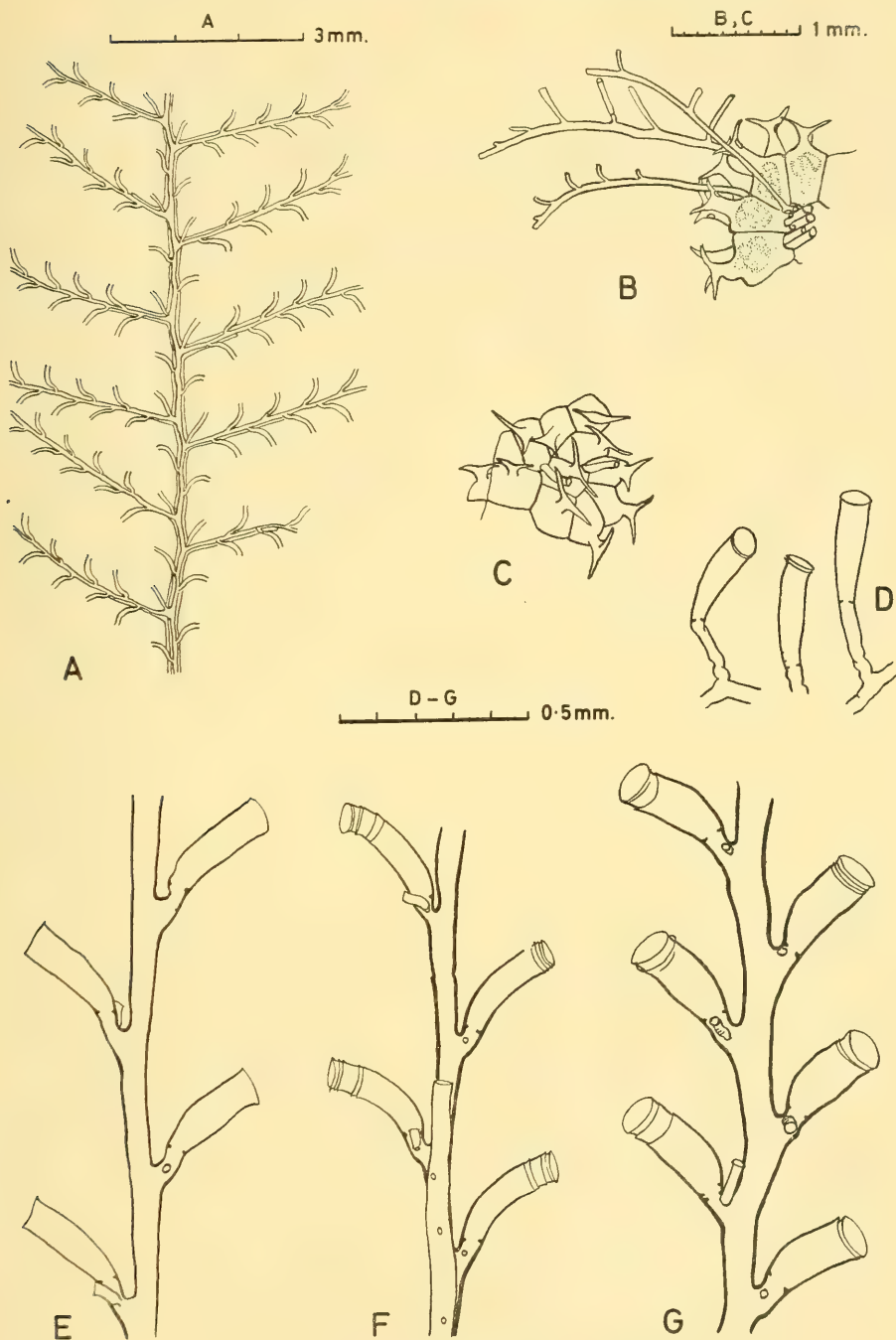
Coppinae present around the stem and larger branches, and also borne on the substratum by the hydrorhiza, reaching about 10 mm. in length and 4 mm. in diameter. Consisting of adpressed gonothecae (about 9–12 visible in cross-section), and numerous branching nematophores. Gonotheca pentagonal or hexagonal in surface view; in lateral view widening from base to top of adpressed part, bearing a free tubular neck surmounted by 2 divergent sharply pointed horns. Each with 2 apertures situated on opposite sides of the distal end of the neck immediately below the horns. Male and female gonothecae borne in separate coppinae, but exactly the same in appearance, female containing a cluster of planula larvae. Nematothecae borne on branching perisarcal tubes which arise from the peripheral tubes of the stem and penetrate between the gonothecae, continuing beyond them to reach a total height of $1\frac{1}{2}$ to $2\frac{1}{2}$ mm.

Solitary hydrothecae borne by hydrorhiza and also by young epizootic colonies growing on the surface of the larger ones. Usually smaller than normal hydrothecae and with longer pedicels. Shape variable; quite symmetrical and straight, irregular, or curved as in the normal type.

<i>Measurements</i> (mm., without reduplications)				AFR 743H SAMH 321	
Final branches, distance between two hydrothecae	..	..	..	0.34–0.48	0.21–0.38
diameter, above hydrotheca	..	..	..	0.05–0.09	0.05–0.07
Pedicel, length adcauline	..	..	..	0.03–0.095	0.02–0.05
Hydrotheca, length adcauline	..	..	..	0.26–0.33	0.24–0.30
length abcauline	..	..	..	0.23–0.28	0.19–0.25
diameter at mouth	..	..	..	0.09–0.10	0.07–0.08
diameter across diaphragm	..	..	..	0.04–0.06	0.05–0.07
Nematotheca, length, including pedicel	..	..	..	0.07–0.12	0.09–0.17
diameter at margin	..	..	..	0.025–0.04	0.02–0.025

Remarks. Although there are slight differences in the appearance of the hydrothecae in these two colonies (e.g. the hydrothecae in SAMH 321 have narrower mouths and shorter pedicels and are more closely set than those in AFR 743H) I can see no reason for specific distinction. Both bear coppinae (male in SAMH 321, female in AFR 743H) which are exactly alike in construction.

Although the branching in general conforms to the scheme outlined above,

FIG. 4. *Zygophylax* spp.

A.-F. *Zygophylax africana* Stechow. A, part of a fascicled stem to show branching (branches cut off short). B, part of a section through a female coppinia, showing gonothecae and branching nematothecae. C, surface view of part of coppinia (horns of gonothecae displaced by pressure of coverslip). D, solitary hydrotheca from epizootic colony. E and F, portions of branches, to show hydrothecae and nematothecae.

G. *Zygophylax armata* (Ritchie). Part of a branch.

(A and F from SAMH 321, B-E from AFR 743H, G from SCD 254P.)

there are many irregularities, and the branches differ greatly in thickness and in the degree to which they subdivide. The general effect is far from regular.

The species has only once been reported, by Stechow in 1923b, off Cape Town. Stechow described a smaller sterile colony reaching only 1.8 cm. in height, and less heavily fascicled. I have seen a slide of Stechow's material loaned by the Munich Museum, and there is no doubt that it is the same species. The coppiniae are described here for the first time.

The coppiniae of this species are strikingly similar to those of *Cryptolaria pectinata* (Allman) (cf. Stechow, 1925, fig. 20). The latter, however, are dioecious, and the female gonotheca has a relatively shorter neck and horns. The two species are also similar in the general appearance of the colony and in the subopposite method of branching. This emphasizes the close relationship between the genus *Cryptolaria* and certain species of *Zygophylax*. In fact, *Cryptolaria*, by the presence and nature of its diaphragm, its nematothecae, subopposite branching and coppinial structure, is more closely related to certain species of *Zygophylax* than the various species of *Zygophylax* are to one another. *Cryptolaria* differs only in the adherent hydrothecae, which as Stechow has shown (1925, p. 450) is a matter of degree only and does not occur in the young stems. I cannot help but feel that the adherent nature of the hydrotheca is not a character of high systematic value, and that it will be necessary in the future to unite *Cryptolaria* with *Zygophylax*, and possibly *Acryptolaria* with *Lafoea*. I hesitate to do so at this stage as my knowledge of the variability of the species in these genera is insufficient.

Zygophylax armata (Ritchie, 1907)

Fig. 4G

Brucella armata Ritchie, 1907: 533, pl. 2 (fig. 2-2c).

Records. South coast: SCD 254P, 297X.

Description. Two colonies, the larger reaching a height of 3.0 cm., with stem and larger branches fascicled. Branching at the base rather irregular, but larger branches and their subdivisions in one plane. The 2 rows of hydrothecae not always in one plane, but with a tendency to shift on to the anterior surface of a branch. Further details of hydrothecae and nematothecae as described by Ritchie, except that the individual measurements are somewhat smaller.

Solitary hydrothecae present on hydrorhiza and in epizootic colonies, with the same proportions as those on branched stem, but less curved, and sometimes completely symmetrical.

Coppiniae absent.

Measurements (mm., without reduplications).

	SCD 254P			
Hydrocladium, diameter above hydrotheca	0.07-0.09
distance between 2 consecutive hydrothecae	0.23-0.35
Hydrothecal pedicel, length adcauline	0.03-0.06

Hydrotheca, length adcauline	0.19-0.26
length abcauline	0.18-0.26
diameter at mouth	0.11-0.13
diameter at level of diaphragm	0.06-0.075
Nematotheca, length, including pedicel	0.05-0.07
diameter at mouth	0.03-0.04

Remarks. This species has only been recorded once before, from off Gough Island in 100 fathoms, and is a new record from South Africa. It can be distinguished from *Z. biarmata* Billard by the nature of the coppinia; and as far as I can determine, the trophosomes of the two species can also be distinguished by the closer approximation of the hydrothecae in *Z. armata* and their more pronounced asymmetry.

Zygophylax cornucopia Millard, 1955

Zygophylax cornucopia Millard, 1955: 219, fig. 3. Millard, 1957: 203.

Records. West coast: TB 1B (reported by Millard, 1955). TRA 156F. South coast: CPR 46K. LIZ 27L, MB 59U. SAMH 192. SCD 36V, 153P.

Description. Colonies epizootic on *Antennella africana* Broch, *A. secundaria* (Gmelin) and *Monostaechas natalensis* Millard.

Zygophylax enigmatica n. sp.

Fig. 5A-F

Holotype: WCD 12E (South African Museum registered number, SAMH 411).

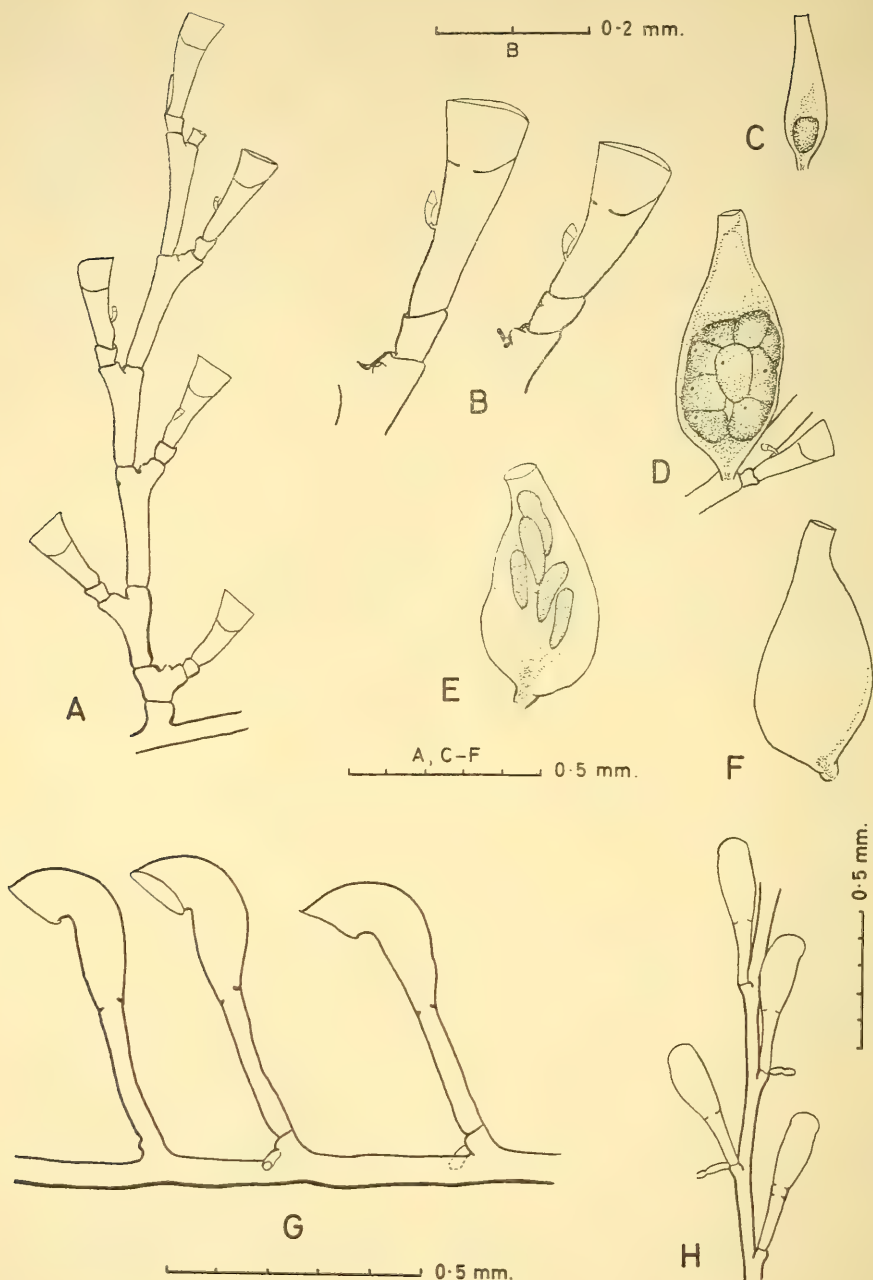
Description. Colony epizootic on *Nemertesia ramosa* Lamx. and reaching a height of 2-3 mm.

Hydrorhiza adherent to stem of host, unsegmented, branching irregularly.

Stem upright and pinnate, divided by straight nodes into long internodes, each of which gives off a hydrocladial apophysis near the distal end. Apophysis with a large mamelon on the upper surface. The first few internodes of the stem sometimes much shorter than the others, and occasionally without hydrocladia. An internodal ridge sometimes present near base of stem internode.

Hydrocladia alternate, the two rows in the same plane. Hydrocladium forming an angle of about 30°-40° with stem. Consisting of one basal internode, followed by a pedicel and hydrotheca which form one unit and are not externally demarcated from one another. Pedicel and hydrotheca expanding evenly towards margin. Thecal margin even, not everted. Pedicel and hydrotheca separated internally by a diaphragm. Diaphragm bilaterally symmetrical, with aperture close to adcauline side, and abcauline section sloping obliquely towards distal end of hydrocladium. Pedicel sometimes with a low internodal ridge near base, and sometimes showing evidence of regeneration.

One nematotheca on each hydrothecal pedicel, seated about midway along adcauline surface, 2-chambered, moveable.

FIG. 5. *Zygophylax* spp.

A.-F. *Zygophylax enigmatica*, n. sp., from the holotype. A, an upright stem. B, two hydrocladia on a larger scale. C-F, gonothecae in various stages of development.

G.-H. *Zygophylax sibogae* Billard, from SCD 301H. G, ventral view of part of a branch. H, anterior view.

Hydranth completely retractable into hydrotheca, hypostome conical when contracted but capable of great distension.

Gonothecae borne on hydrocladial apophyses, very large in comparison with size of hydrothecae. Each gonotheca laterally compressed in a plane at right angles to the axis of the stem, flask-shaped, and tapering to a slender neck. Neck sometimes curved to one side, with margin obliquely set. Containing about 8–10 eggs which develop *in situ* to planula larvae.

Measurements (mm.)

Hydrorhiza, diameter	..	..	..	..	..	..	0.04–0.08
Stem internode, length (not the first 2)	..	..	..	..	..	..	0.20–0.34
diameter	..	..	..	..	..	..	0.04–0.07
Hydrocladium, basal segment, length	..	..	..	..	..	..	0.03–0.07
pedicel, length to diaphragm	..	..	..	..	..	..	0.10–0.20
hydrotheca, height from diaphragm	..	..	..	..	..	..	0.07–0.10
diameter at margin	..	..	..	..	..	..	0.095–0.11
Nematotheca, length	..	..	..	..	..	..	0.035–0.05
Gonotheca, length	..	..	..	..	..	..	0.60–0.71
diameter	..	..	..	..	..	..	0.23–0.33

Remarks. This minute species is obviously closely related to *Z. cornucopia* Millard, particularly in the structure and proportions of the hydrotheca and its pedicel and in the absence of a coppinia, but differs from it in the presence of an upright, pinnate stem.

Both species show tendencies towards the Plumulariidae, but cannot be included in that family since the hydrothecae are not sessile, but borne on a pedicel from which they are separated by a diaphragm. The continuity of pedicel and hydrotheca is characteristic of other species of *Zygophylax*.

Zygophylax sibogae Billard, 1918

Fig. 5G-H

Zygophylax sibogae Billard, 1918: 21, fig. 1. Totton, 1930: 167, fig. 21. Ralph, 1958: 311, fig. 2, e-i.

Records. South coast: SCD 301H.

Description. A number of fascicled stems reaching a maximum height of 3.1 cm., branching pinnately and in one plane. Branches generally arising below every third and fourth hydrotheca, the lower ones fascicled at base and often rebranching in a similar manner.

Hydrothecae borne in two longitudinal rows on the anterior surface of stem and branches, with a sharp angle between the rows, and with the members of one row twisted slightly away from those of the other row. Hydrotheca strongly curved towards distal end of branch, widening to circular aperture which faces towards branch and slightly to one side. Borne on long pedicel of approximately the same length. Diaphragm well developed, often funnel-shaped. Pedicel usually separated from stem apophysis by distinct node.

Nematothecae borne on peripheral tubes and one on the lateral surface of each hydrothecal apophysis, tubular and narrowing slightly to margin, normally about 0.07 mm. in length, but often abnormally lengthened by regeneration.

Gonophores absent.

Measurements (mm.)

Hydrocladium, distance between 2 pedicels	..	..	..	0.28-0.37
diameter	..	..	..	0.05-0.07
Pedicel, length (without apophysis)	..	..	..	0.20-0.26
Hydrotheca, length adcauline	..	..	..	0.16-0.20
maximum length	..	..	..	0.26-0.30
diameter at mouth	..	..	..	0.11-0.13
diameter at diaphragm	..	..	..	0.045-0.05
Nematotheca, length	..	..	..	0.07-0.32
maximum diameter	..	..	..	0.025-0.035
diameter at mouth	..	..	..	0.015-0.03

Remarks. The hydrothecae in this colony have a beautifully regular arrangement, more so than those figured by Ralph, and in appearance are exactly like Billard's diagram. The measurements of hydrothecal length and pedicel length are slightly less than those given by Totton and Ralph, but there is no doubt about the identification of the material.

This species is closely related to *Z. infundibulum* Millard, 1958, differing from it in the greater length of the pedicel and the more marked curvature of the hydrotheca.

Z. sibogae is known from the East Indies and New Zealand. This is the first record from South Africa.

Family **Synthechiidae**

Hincksella cylindrica pusilla Ritchie, 1910

Fig. 6A-D

Sertularella cylindrica var. *pusilla* Ritchie, 1910: 817, pl. 77 (fig. 9).

Hincksella cylindrica var. *pusilla*: Billard, 1925: 124. Vervoort, 1959: 247, fig. 19 b, c.

Synthecium cylindricum var. *pusilla*: Leloup, 1935: 31, fig. 14.

Records. South coast: SCD 297Y.

Description. A single colony of about 6 unfascicled and unbranched stems reaching a maximum height of 0.7 cm. Internodes of irregular length, separated by slightly oblique nodes, and each bearing a hydrotheca near the distal end.

Hydrothecae very delicate, and most of them crumpled, adnate for about $\frac{1}{4}$ adcauline side, then bent outwards. Margin slightly everted, often regenerated.

Gonothecae absent.

Measurements (mm., without reduplications)

Internode length	..	..	..	..	..	0.29-0.54
diameter at node	..	..	..	..	..	0.05-0.09

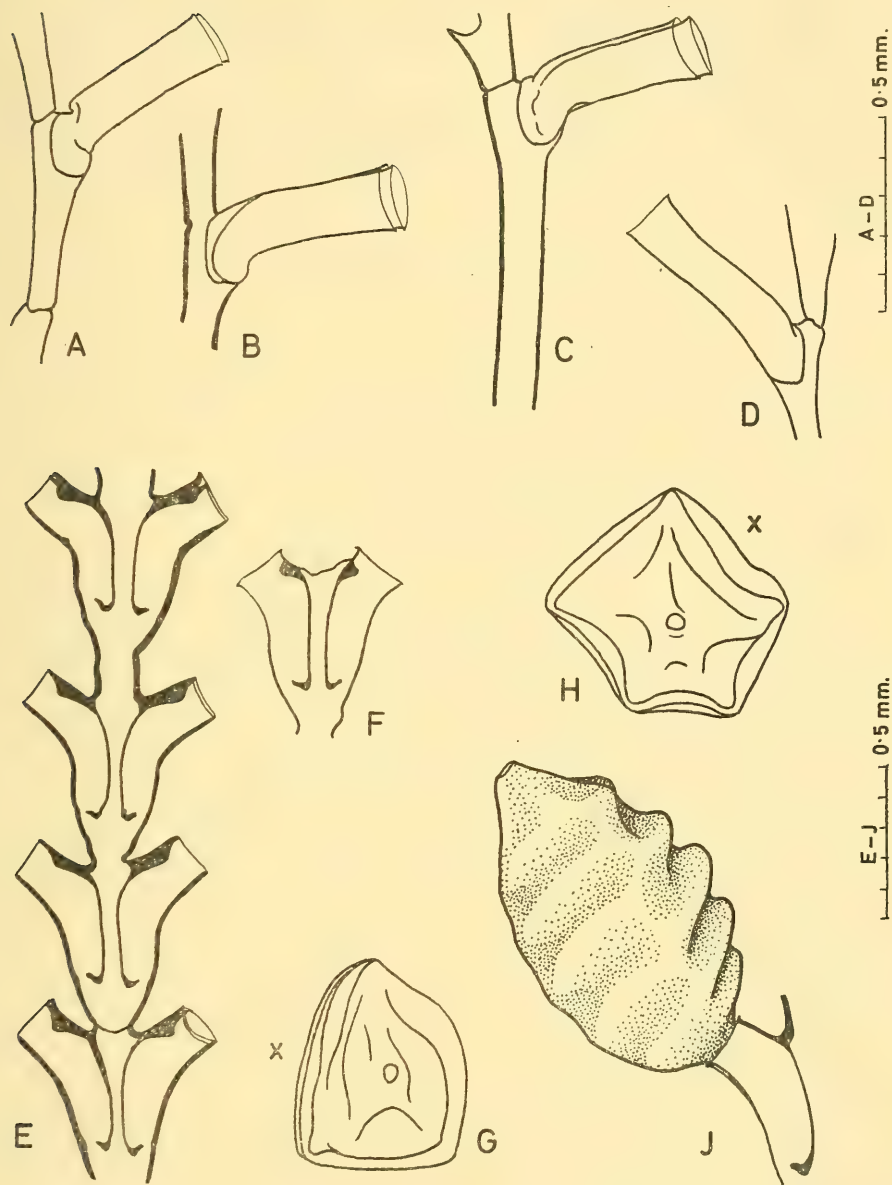


FIG. 6. Syntheciidae.

A.-D. *Hincksella cylindrica pusilla* Ritchie. Hydrothecae from SCD 297Y.E.-J. *Synthecium dentigerum* Jarvis, from SCD 84G. E and F, portions of hydrocladia. G and H, 2 gonothecae viewed from the distal end (adcauline surface indicated by x). J, gonotheca in side view.

Hydrotheca, total length in centre	0.49-0.60
length adcauline, adnate part	0.15-0.18
length adcauline, free part	0.44-0.47
adnate part/adcauline length	0.24-0.29
diameter at margin	0.14-0.17

Remarks. This is the first record of the species from South Africa. Subspecies *pusilla* has previously been recorded from the Mergui Archipelago, East Indies, Japan, tropical West Africa and the West Indies.

Syntheticum dentigerum Jarvis, 1922

Fig. 6E-J

Syntheticum dentigerum Jarvis, 1922: 344, pl. 25 (fig. 15 a, b). Totton, 1930: 172.

Records. South coast: SAMH 375. SCD 52G, 84G, 112F. TRA 151G.

Description. A number of colonies reaching a maximum height of 4.0 cm. Stem unfascicled, pinnate, divided into internodes by straight nodes, which are sometimes obscure. Arrangement on internodes variable, common arrangements including 2 pairs of hydrothecae with a pair of opposite hydrocladia arising between them, and one pair of opposite hydrocladia followed by one pair of hydrothecae.

Hydrotheca as described and figured by Jarvis, with one large, adcauline, internal tooth, but the presence of this tooth is by no means constant and is sometimes found on only a few hydrothecae of a colony. Occasional hydrothecae with a small triangular thickening in the centre of the abcauline wall.

Gonothecae (not previously described) borne on stem or hydrocladia, arising within hydrothecae; generally pentagonal when viewed from above, though sometimes two of the angles are smoothed out resulting in a rather flattened triangle; with 5-6 transverse folds on the flat surfaces, which may peter out on the angles or continue over them, but do not produce a definite zigzag line of junction; tapering distally to a small circular opening. Sex not determinable.

Measurements (mm.)

Hydrocladium, internode length	0.58-0.76
Hydrotheca, length abcauline	0.34-0.41
length adcauline, adnate part	0.38-0.48
length adcauline, free part	0.08-0.17
adnate part/adcauline length	0.69-0.85
diameter near base	0.14-0.17
diameter at margin	0.16-0.20
Gonotheca, length	1.01-1.40
maximum diameter	0.56-0.77

Remarks. The dimensions of this material are slightly less than those given by Totton for *S. dentigerum*, but are closer than to *S. carinatum* Totton, a closely

related species with internal teeth. The gonotheca of the latter is also different.

S. dentigerum has only been reported once, from Chagos in the Indian Ocean by Jarvis. This is the first record from South Africa.

Synthecium ?elegans Allman, 1872

Synthecium ?elegans: Millard, 1957: 203, fig. 9D. Millard, 1958: 182.

Records. South coast: MB 8U, 64N.

Remarks. As the gonothecae of this species have still not been found in South Africa, the identification must remain uncertain.

Synthecium hians Millard, 1957

Synthecium hians Millard, 1957: 204, fig. 9 A-C.

Records. South coast: MB 12Y, 64L. SAMH 151, 188, 281, 374. SCD 37L, 52F, 84H, 119N, 250K, 254N, 296F. TRA 38G.

Family **Sertulariidae**

Amphisbetia bidens (Bale, 1884)

Thuiaria bidens: Day, Millard & Harrison, 1952: 404 (listed).

Amphisbetia bidens: Millard, 1957: 220. Millard, 1958: 182.

Records. South coast: BMR 23M. KNY 30K, 70D (recorded by Day *et al.* 1952). LIZ 7P, 11H. MB 15F, 24N, 47L, 88M. SAMH 261, 378. SCD 60A, 84K, 153V, 330E.

Amphisbetia minima (Thompson, 1879)

Amphisbetia minima: Millard, 1957: 221. Millard, 1958: 183. Ralph, 1961: 774, figs. 8 a-h.

Records. West coast: B 114F. CP 650A. TRA 156J. WCD 34J, 81F. South coast: MB 24Q.

Description. Stems reaching a maximum height of 0.5 cm., and bearing up to 15 pairs of hydrothecae. Male and female gonothecae present, similar in structure, usually arising below the first pair of hydrothecae, but occasionally below the second or third pair.

Amphisbetia operculata (Linn., 1758)

?*Sertularia aperta* Allman, 1886: 138, pl. 13 (figs. 1, 2).

Sertularia operculata: Day, Millard & Harrison, 1952: 404 (listed).

Amphisbetia operculata: Millard, 1957: 221. Millard, 1958: 183. Millard, 1961: 204. Ralph, 1961: 775, fig. 8 i-k.

Records. West coast: B 137. LAM 14T, 45Y. SAMH 403. SB 194M. TB 21E. TRA 156H. WCD 34G, 81C. South coast: BMR 9M. CPR 9C. KNY 22G, 30L, 57H, 70A (recorded by Day *et al.* 1952). LIZ 2F, 7Q, 11G. MB 24P, 52A. SAMH 232, 358, 376. SCD 84L, 284A, 304H.

Remarks. Many of these colonies show a form of branching approaching that of *A. fasciculata* (Kirch.), and similar to that figured by Allman, 1886, pl. 14, for *Sertularia crinis* (considered by Billard, 1910, who examined the types, to be conspecific with *A. operculata*), with an elongated 'main stem' and subsidiary branches which may subdivide once or twice. There is sometimes, but not always, a difference in internode length and thickness between the smaller branches and 'main stem' (where the length may be almost twice as great), but the difference is never so marked as described by Ralph, 1961, for *A. fasciculata*. Since this and the normal form may occur in the same colony, it is not possible to distinguish two species. The height of the colony never exceeds about 14 cm.

Sertularia aperta Allman, 1886, from the Cape of Good Hope is almost certainly a growth-form of the same species.

Crateritheca acanthostoma (Bale, 1882)

Fig. 7

?*Dynamena pluridentata* Kirchenpauer, 1864: 14, fig. 10.

Sertularia acanthostoma: Bale, 1884: 85, pl. 4 (figs. 7-8). Billard, 1907: 352. Warren, 1908: 303, pl. 46 (figs. 23-26), fig. 7. Bale, 1913: 131.

Stereothecha acanthostoma: Millard, 1958: 199.

Crateritheca acanthostoma: Ralph, 1961: 756, fig. 2c.

Records. South coast: SCD 50A.

Description. Several pinnate stems reaching a maximum height of 2.4 cm. Arrangement of hydrocladia, internodes and hydrothecae as in previous descriptions.

Hydrotheca adnate for a little over half adcauline length, with no external ridges or furrows, but with 3 intrathecal septa. These include (fig. 7A, C, D):

- (a) an adcauline septum about half-way up the hydrotheca in the form of a horizontal shelf bearing 2 or 3 minute denticles on the free inner edge,
- (b) a lower abcauline septum about a quarter of the way up, in the form of a horizontal shelf behind which is an opening for the passage of a strand of ectoderm, and below which is situated the abcauline blind pouch of the hydranth,
- (c) an upper abcauline septum about three-quarters of the way up in the form of a narrow horizontal shelf forming the base of a longitudinal trough communicating with the cavity of the hydrotheca and extending to the margin. This trough contains a cluster of large nematocysts embedded in ectoderm which is continuous with the strand passing behind septum b.

Hydropore surrounded by a raised funnel-shaped ridge. Operculum of a single membranous plate filling complete orifice. Marginal teeth and soft parts as described by Warren.

Gonothecae absent.

Remarks. The genus *Crateritheca* is recognized here on the basis of remarks by

Totton, 1930, p. 207, and Ralph, 1961, although the diagnosis of the latter author will need modification to include *C. acanthostoma*.

Stechow in 1919 included Warren's material from Natal and Billard's material from Madagascar in Kirchenpauer's species '*Dynamena*' *pluridentata* from the Cape of Good Hope, although in 1925 he kept them separate. As Kirchenpauer's species is inadequately described and illustrated, and might from the diagrams equally well be *Stereotheca elongata*, no certainty can be reached on this matter.

The South African material of the species differs in certain respects from the Australian material as shown by dissections of hydrothecae made under a high-power dissecting microscope. Thus, the hydrotheca has a smaller propor-

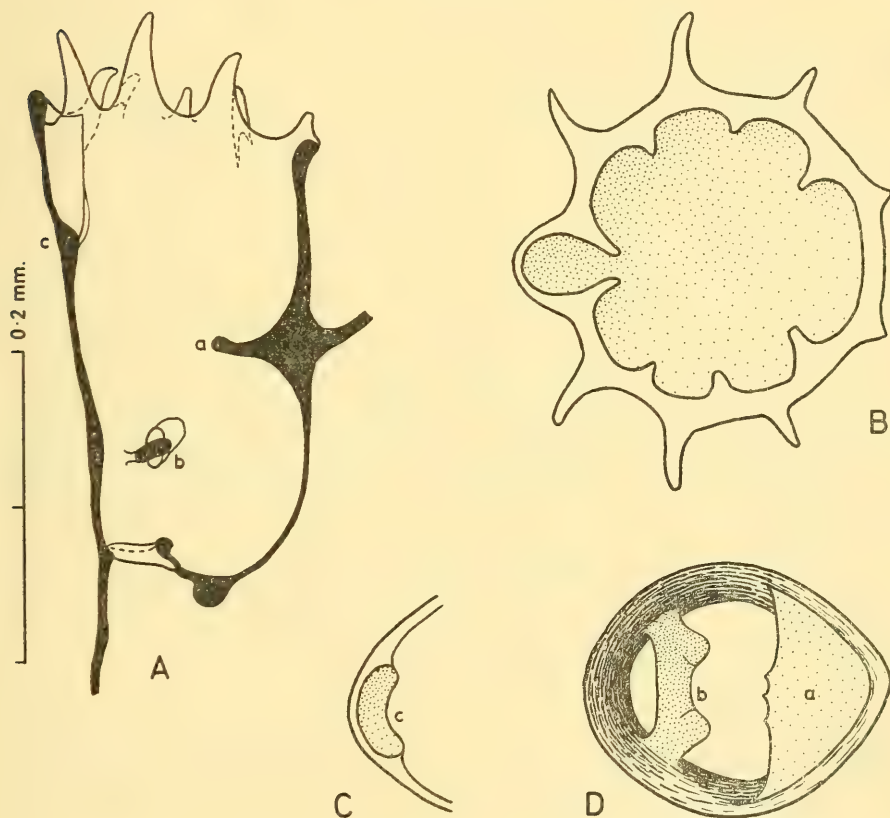


FIG. 7. *Crateritheca acanthostoma* (Bale).

- A. A single hydrotheca in side view. Adcauline surface on right.
 B.-D. Free-hand diagrams drawn from dissections of hydrothecae. B, distal view of complete hydrotheca with operculum in position. C, distal view of cross-section through abcauline wall taken near distal end. D, distal view of cross-section through hydrotheca at a slightly deeper level.
 a, the adcauline septum; b, the lower abcauline septum; c, the upper abcauline septum.

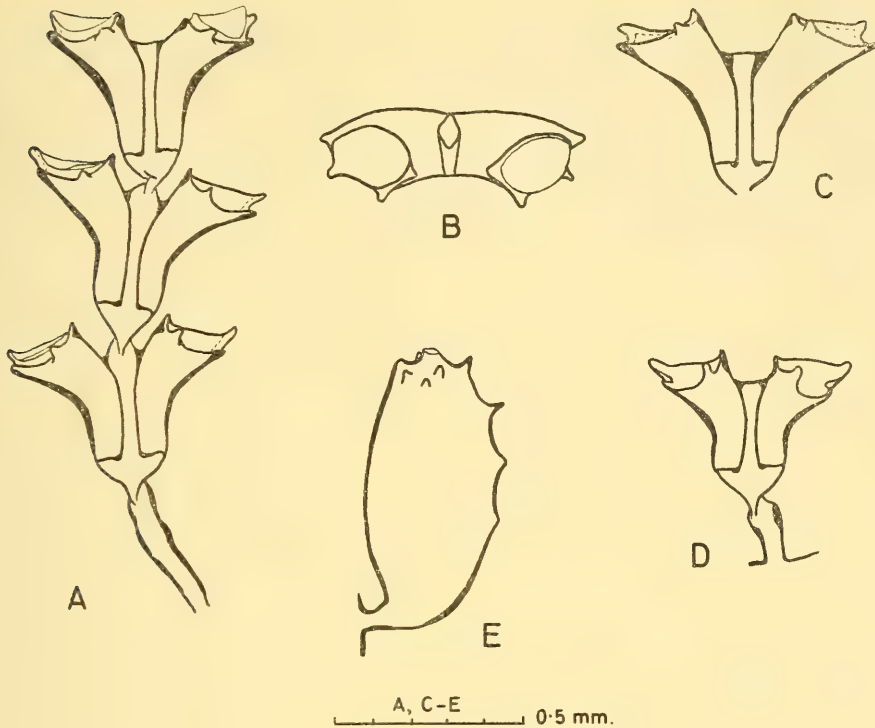


FIG. 8. *Diphasia tetraglochina* Billard.

- A. A stem with 3 pairs of hydrothecae.
- B. Sketch of distal view of a pair of hydrothecae to show asymmetry. Operculum in place in right hydrotheca.
- C. The distal pair of hydrothecae from a stem with 5 pairs.
- D. The proximal pair from another stem.
- E. The gonotheca.

Remarks. This rare species has only been recorded once before, from Madagascar. It was not possible to determine the sex of the gonothecae.

Dynamena cornicina McCrady, 1858

Fig. 9

Sertularia densa Stechow, 1919: 93, fig. J¹.

Sertularia cornicina: Jarvis, 1922: 338.

Dynamena cornicina: Billard, 1925: 188, pl. 7 (fig. 23), fig. 40. Broch, 1933: 86, fig. 36. Vervoort, 1941: 206, fig. 3.

Records. South coast: LIZ 16C, 40J.

Description. Two colonies, one very rich, growing on coralline algae. Only simple stems present, reaching a maximum height of 0.9 cm. Stem with short, proximal, athecate region terminated by a hinge-joint, and a long thecate region divided into regular internodes by constricted nodes. Each internode bearing a pair of opposite hydrothecae. Consecutive pairs of hydrothecae close,

length adcauline, adnate part	0.35-0.46
length adcauline, free part	0.14-0.25
adnate part/adcauline length	0.59-0.76
diameter at margin	0.13-0.175
Gonotheca, length	1.06-1.38
maximum diameter	0.76-0.88

Remarks. In this material the pairs of hydrothecae are closely set on the stem, thus resembling that illustrated by Stechow, 1919.

The species has been reported by Jarvis, 1922, from tropical East Africa, but this is the first record from South Africa.

Dynamena crisioides crisioides Lamouroux, 1824

Dynamena crisioides: Millard, 1958: 183. Vervoort, 1959: 260, fig. 27 a, b.

Records. South coast: CPR 7A.

Dynamena quadridentata nodosa Hargitt, 1908

Dynamena quadridentata var. *nodosa*: Billard, 1925: 197, fig. 43D. Millard, 1958: 186, fig. 6B.

Pasythea quadridentata: Warren, 1908: 312, fig. 11.

Dynamena gibbosa Billard, 1925: 199, fig. 45.

Records. South coast: SCD 50P.

Remarks. The South African material of this species appears to be intermediate between *D. quadridentata nodosa* and *D. gibbosa*, which is included here as a synonym.

Salacia articulata (Pallas, 1766)

Fig. 10G

Salacia articulata: Millard, 1957: 208 (synonymy). Millard, 1958: 186. Millard, 1961: 205.

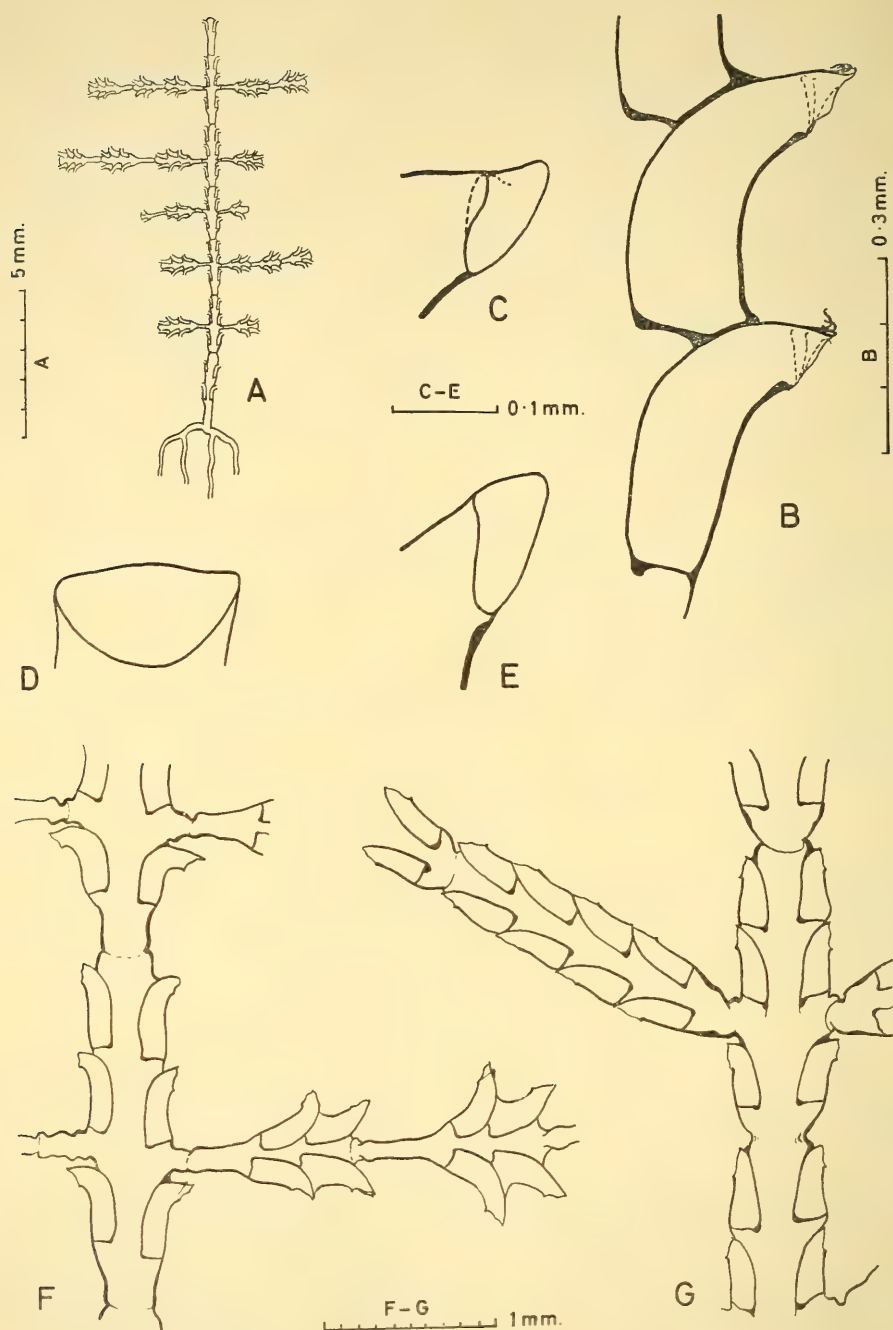
Records. West coast: LAM 7N, 30N. SB 153R, 168E. WCD 12C, 81E. South coast: L 452B. MB 47X, 84B. SAMH 152, 262, 295, 377. SCD 36X, 52N, 56R, 84M, 138J, 153Q, 296G, 330D. TRA 92L.

Salacia disjuncta nov. sp.

Fig. 10A-F

Types. Holotype: SCD 37K (South African Museum registered number, SAMH 412). Paratype: SCD 296H. (Both from South coast.)

Description of Holotype. A single rooted stem 1.4 cm. in height. Stem upright, moderately stiff, not zigzag, pinnate, divided by straight nodes into distinct internodes each of which bears 3 pairs of hydrothecae and 1 pair of opposite hydrocladia arising between the first and second pairs of hydrothecae. First internode of stem with 2 pairs of hydrothecae only. Stem constricted at nodes. Members of a pair of hydrothecae opposite or subopposite, not in contact with one another. The two rows of hydrothecae in 1 plane and on opposite sides of the stem. Consecutive pairs of hydrothecae on an internode separated by a short

FIG. 10. *Salacia* spp.

A.-F. *Salacia disjuncta* n. sp. A, whole colony. B, 2 hydrothecae of a group. C-E, various views of the margin, C showing the operculum (in broken line). F, part of stem and hydrocladia.
 G. *Salacia articulata* (Pallas). Part of stem and hydrocladium as a comparison with *S. disjuncta*.
 (A-C, F from SCD 37K; D-E from SCD 296H; G from F 254.)

interval or slightly overlapping; the group on one internode well separated from that on the next. Hydrocladia arising from the stem at right angles, the 2 rows in one plane.

Hydrocladium borne on a stem apophysis of variable length, divided into distinct internodes of variable length by constricted nodes. Each internode consisting of a slender proximal region without hydrothecae occupying up to half its length, and a wider distal region bearing 2 or 3 pairs of hydrothecae arranged in a close and overlapping group reminiscent of the genus *Dynamena*. Members of a pair of hydrothecae opposite or subopposite, not in contact with each other; the 2 rows in one plane.

Hydrotheca tubular, narrowing slightly to margin, slightly turbinate in proximal region, smoothly bent outwards in distal region, adnate for most of adcauline length, but with at least 1/10 free. Margin more or less parallel to axis of stem in cauline hydrothecae, but variable in hydrocladial hydrothecae (facing slightly downwards in the proximal pair of a group and slightly upwards in the distal pair). Aperture widened transversely, with no marginal teeth or occasionally with 2 low, rounded, lateral lobes. Operculum of 1 large abcauline valve. Hydranth with no abcauline blind pouch.

Gonothecae absent.

Measurements (mm., exclusive of regenerations).

					<i>Holotype</i>	<i>Paratype</i>
Stem, normal internode, length	..	..	..	..	1.86-2.16	2.06-2.34
diameter at node	..	..	..	..	0.22-0.30	0.15-0.25
Hydrocladium, internode length	..	..	..	..	0.91-1.72	1.20-1.78
diameter at node	..	..	..	..	0.09-0.12	0.09-0.11
Hydrotheca, length abcauline (cauline only)				..	0.29-0.36	0.30-0.42
*length adcauline, adnate part	..	..	..	..	0.30-0.46	0.30-0.47
*length adcauline, free part	..	..	..	..	0.08-0.25	0.08-0.21
*adnate part/adcauline length	..	..	..	..	0.55-0.85	0.61-0.85
diameter at margin	..	..	..	..	0.10-0.14	0.10-0.12

*Including cauline hydrothecae and those on the distal ends of hydrocladial groups.

Remarks. This species is very distinct and easily recognized by its strictly opposite hydrocladia and marked grouping of the hydrothecae on the hydrocladia. Although quite different in appearance from *S. articulata*, it resembles this species in many details of construction and is closely related to it. It can be distinguished by:

- (a) the position of the hydrocladium which forms a right angle with the stem,
- (b) the more slender stem internodes,
- (c) the nature of the hydrocladial internodes, with their slender proximal region and marked bunching of hydrothecae in the distal region,
- (d) the hydrothecae, which are more bent outwards and are not completely adnate.

The paratype consists of 2 stems, the larger 1.9 cm. in height, in which certain irregularities occur; thus 2 of the stem internodes bear but one hydrotheca each, and there is a tendency towards stolon formation from the tips of the hydrocladia.

GENUS SERTULARELLA

Remarks on the diagnosis of species

As has been indicated by Picard (1956) and Millard (1958), the shape of the hydrotheca is sometimes used as a basis for specific differentiation in *Sertularella*. Thus, Picard distinguishes between species in which the margin is tilted towards the distal end of the colony, and those in which the margin is tilted towards the base.

However, it has been found in practice that the category is not always obvious, due to variations in the curvature of the walls and elongation of one or other marginal tooth, and if such categories are to be used it is necessary that they should be more accurately defined. It is proposed, therefore, to distinguish three hydrothecal types, which are defined as follows (fig. 11):

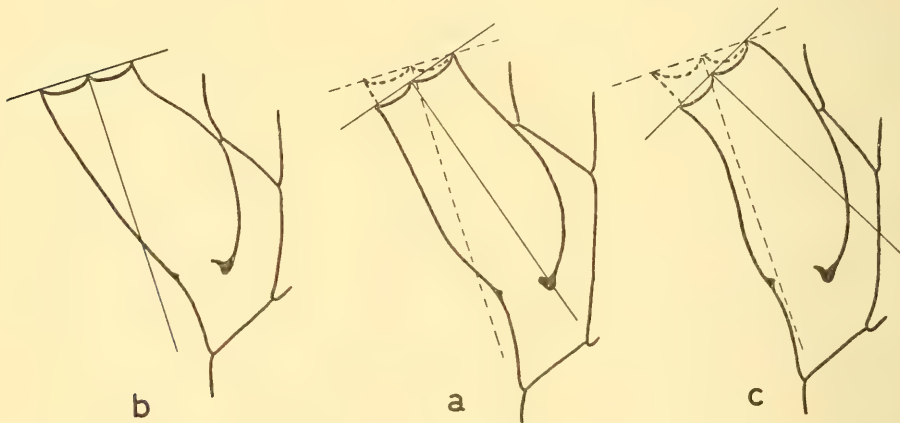


FIG. 11. *Sertularella*.

The three categories of hydrothecal shape. Types a and c could be converted to b by the enlargement of the abcauline marginal tooth (dotted lines). See text for description.

- (a) *Hydrothecal margin perpendicular to axis*. Forms with a hydrotheca which is obviously symmetrical in lateral view, and in which a line drawn at right angles to the margin and passing through the lateral marginal tooth, will bisect the perisarcal thickening at the base of the adcauline wall, e.g. typical examples of *S. fusiformis* and *S. capensis*.
- (b) *Hydrothecal margin tilted towards adcauline side*. Forms in which a line drawn at right angles to the margin and passing through the lateral marginal tooth will pass through the abcauline wall outside the

base of the hydrotheca (e.g. *S. mediterranea*), or in less extreme examples through the hydropore (e.g. *S. africana*).

- (c) *Hydrothecal margin tilted towards abcauline side*. Forms in which a line drawn at right angles to the margin and passing through the lateral marginal tooth will pass through the adcauline wall (distal to the perisarcal thickening at its base), e.g. *S. arbuscula*, *S. xantha*.

In the following descriptions the categories will be used in this sense. It will be seen that some species belong strictly to one particular category, but that others can vary from one to another.

Measurements

Measurements of adcauline and abcauline hydrothecal lengths are taken from the base of the hydrotheca to the tip of the respective marginal tooth across any curvature which may be present. Adcauline measurements include the perisarcal thickening at the base of the adcauline wall. All measurements are exclusive of marginal regenerations. The diameter of the internode is measured diagonally across the node.

Sertularella africana Stechow, 1919

Sertularella fusiformis: Warren, 1908: 295, fig. 5C, D.

Sertularella tenella: Stephenson, Stephenson & du Toit, 1937: 374 (listed).

Sertularella africana: Millard, 1957: 207, figs. 10I, 11F.

Records. West coast: A 382. LAM 2H, 9U. PP 1T. SB 168F. South coast: CPR 7B. E 134. S 65D (recorded by Stephenson *et al.* 1937). SAMH 208, 218. TRA 159C.

Remarks. Examination of Warren's material from Park Rynie, Natal, in the British Museum (reg. no. 22.3.6.20) confirms the identity of the above material.

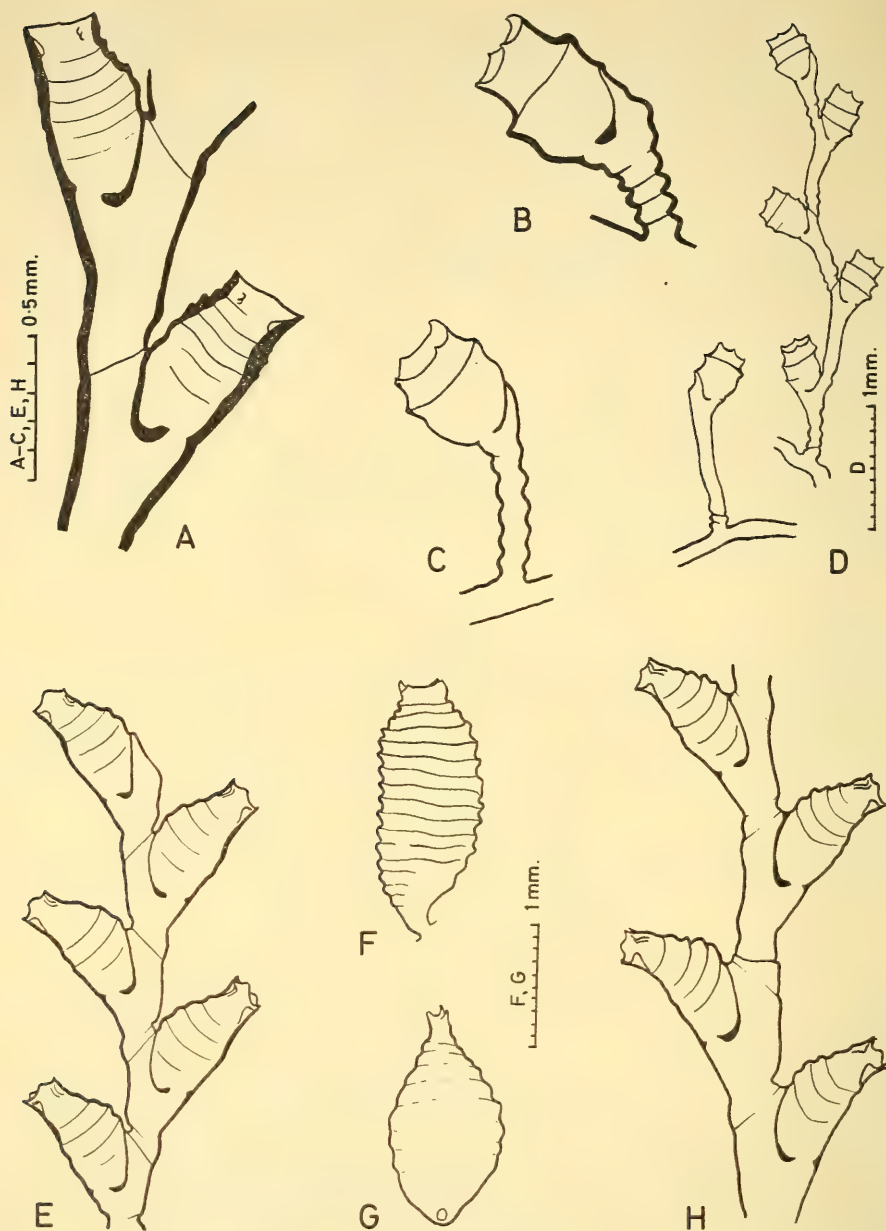
Sertularella agulhensis, nov. sp.

Fig. 12A

Holotype: TRA 151F, from south coast, (South African Museum registered number, SAMH 413).

Description. Stem stiff, fascicled, reaching a maximum height of 3.2 cm., branching (and often rebranching) in a pinnate fashion, normally with 3 hydrothecae between the origins of successive branches. All branches in one plane. Nodes oblique and distinct in terminal regions, often indistinct in older parts of colony. Hydrothecae fairly closely set with the margin of one usually overlapping the base of the next, one to each internode, the two rows in one plane. Perisarc thick.

Hydrotheca adnate for about half adcauline length, distinctly annulated for most of length (about 6 annulations), with convex adcauline wall and straight or slightly concave abcauline wall. Abcauline side of margin produced more than the rest. Margin perpendicular to axis of hydrotheca or tilted slightly

FIG. 12. *Sertularella* spp.A. *Sertularella agulhensis* n. sp.B.-D. *Sertularella capensis delicata* n. subsp. B and C, solitary hydrothecae. D, an upright stem and a solitary hydrotheca.F. *Sertularella capensis capensis* Millard, gonotheca.E, G, H. *Sertularella gilchristi* n. sp.

(A from TRA 151F, B from SAMH 294, C from SCD 50Q, D from NAD 22F, E and G from the holotype, F from SCD 37G, H from SCD 153X.)

towards adcauline side. 3 internal teeth: 1 abcauline, 2 latero-adcauline, the latter often quite small.

Gonothecae absent.

Measurements (mm.)

Internode length	..	..	..	..	..	..	0.40-0.59
diameter across node	..	..	..	..	..	..	0.24-0.33
Hydrotheca, length abcauline	..	..	..	..	..	..	0.52-0.67
length adcauline, adnate part	..	..	..	..	..	..	0.30-0.37
length adcauline, free part	..	..	..	..	..	..	0.34-0.44
adnate part/adcauline length	..	..	..	..	..	..	0.41-0.51
diameter at mouth	..	..	..	..	..	..	0.23-0.28
maximum diameter	..	..	..	..	..	..	0.31-0.37

Remarks. This species resembles *S. mediterranea* in the shape of the hydrotheca and in the presence of 3 internal teeth, but differs from it in the fascicled stem and annulated hydrotheca.

The structure of the hydrotheca strongly resembles that of *S. richardsoni* Ralph, 1961, but *S. agulhensis* differs from it in the smaller size of the parts and in the fascicled stem.

Sertularella arbuscula (Lamx., 1816)

Sertularia polyzonias: Busk, 1851: 118 (pp.)

Sertularia arbuscula?: Busk, 1851: 118.

Sertularella tumida Warren, 1908: 297, fig. 6A-C. Jarvis, 1922: 342.

Sertularella arbuscula var. *quinelaminata* Leloup, 1934: 1, figs. 1-3.

Sertularella arbuscula: Millard, 1957: 208, figs. 10B, 11C. Millard, 1958: 188. Millard, 1961: 204.

Records. West coast: A 381. SB 194K. WCD 34H, 81D. South coast: KNY 30N, 71E (reported by Day *et al.* 1952). LIZ 16D. MB 8L, 15C, 64H. SAMH 155, 182, 204, 213, 216, 228, 234, 288, 318. SCD 37C, 61B, 75D, 85D, 117H, 153U, 169Z, 175H, 184P, 354E. TRA 35F, 38F, 42F, 92S, 156G.

Remarks. I have examined specimens of Jarvis's material of *S. tumida* from the Indian Ocean and Warren's material of *S. tumida* from Algoa Bay in the British Museum of Natural History, and can confirm their identity as typical *S. arbuscula*. Unfortunately Warren's material from Park Rynie, Natal, (Warren, 1908, fig. 6B) was not available, but I feel that Stechow (1925, p. 485) was wrong in assigning it to *S. pulchra*, which species is easily distinguished by the adcauline annulations and 4 internal teeth. I have seen unmistakable material of *S. arbuscula* in which some of the hydrothecae are very little bent out as in Warren's diagram, and I have also seen gonothecae which are corrugated in the distal region.

The presence of 2 extra internal teeth (var. *quinelaminata* of Leloup) is a common variation (found also in *S. mediterranea*), but usually occurs only in some hydrothecae of a colony.

Sertularella capensis capensis Millard, 1957

Fig. 12F

Sertularella capensis Millard, 1957: 210, fig. 10H.*Records.* South coast: SAMH 272. SCD 37G, 79K.*Description.* Three colonies similar to holotype.

Female gonothecae (not previously described) borne on front of stem, each arising just below the base of a hydrotheca. Spindle-shaped, distinctly annulated throughout, with 4 (or occasionally more) marginal spines. No external marsupium and eggs released within the gonotheca.

Remarks. See under subspecies *delicata*.*Sertularella capensis delicata* nov. subsp.

Fig. 12B-D

Sertularella tenella: Hartlaub, 1901: 64, pl. 5 (fig. 24), (material from Algoa Bay).

Types and Records. Holotype: (NAD 22F) (South African Museum registered number, SAMH 414). Other records: SAMH 294, SCD 50Q.

Description of holotype. Stem short, slender and geniculate; unbranched; bearing a small number of hydrothecae (up to 8 observed) and sometimes only one; usually annulated at base and in the region of nodes.

Hydrotheca similar in shape and appearance to the nominate subspecies, but with a smaller proportion of the adcauline wall adnate (less than half); with one or two distinct ridged annulations; mouth rounded in section.

Gonophores absent.

Measurements (mm.)

					<i>Holotype</i>	<i>SAMH 294</i>
Internode length	..	..	..	..	0.49-0.97	
diameter across node	..	..	..	..	0.10-0.13	
Hydrotheca, length abcauline	..	..	..	..	0.34-0.45	0.40-0.45
length adcauline, adnate part	..	..	..	..	0.20-0.24	0.20-0.22
length adcauline, free part	..	..	..	..	0.25-0.34	0.34-0.35
adnate part/adcauline length	..	..	..	..	0.37-0.46	0.36-0.39
diameter at mouth	..	..	..	..	0.25-0.29	0.28-0.30
maximum diameter	..	..	..	..	0.30-0.37	0.41-0.43

Remarks. The samples other than the holotype consist almost entirely of solitary hydrothecae, and stems bearing more than one hydrotheca are rare. Such specimens are similar to the material from Algoa Bay described and figured by Hartlaub in 1901 and ascribed by him to *S. tenella*. With this diagnosis I do not agree, as the hydrotheca of *S. tenella* has more annulations, a smaller proportion of the adcauline wall adnate to the stem and a narrower, squared mouth. The proportion between the diameter at the mouth and the abcauline length is 0.59-0.79 mm. in the holotype of *S. capensis delicata*, as against 0.39 mm. in typical *S. tenella* (from Stechow's measurements, 1923c, p. 186).

That the solitary hydrotheca is merely a young stage of an upright stem is shown by the presence of both on the same hydrorhiza. Moreover, in the solitary hydrotheca there is an extension of the internode along one wall containing a bud of coenosarc, which will obviously form the continuation of the stem at a later stage. This extension is visible in Hartlaub's diagram, and also in Leloup's diagram of *Thyroscyphus intermedius* f. *peculiaris* (1935, fig. 15) indicating that the latter is merely a young *Sertularella*. *Sertularella campanulata* Warren, 1908, however, has no such extension and can justifiably be included in a separate genus, i.e. *Calamphora*.

The subspecies *delicata* differs from the young stems and branches of the nominate subspecies in the more slender stem with annulations and a hydrotheca which has a smaller proportion adnate to the internode.

S. capensis shows some resemblances to *S. gayi* var. *annulata* Allman, 1888, as revised by Billard, 1910, p. 10, fig. 3, but differs from it in the growth-form.

Sertularella congregata nov. sp.

Fig. 13A-D

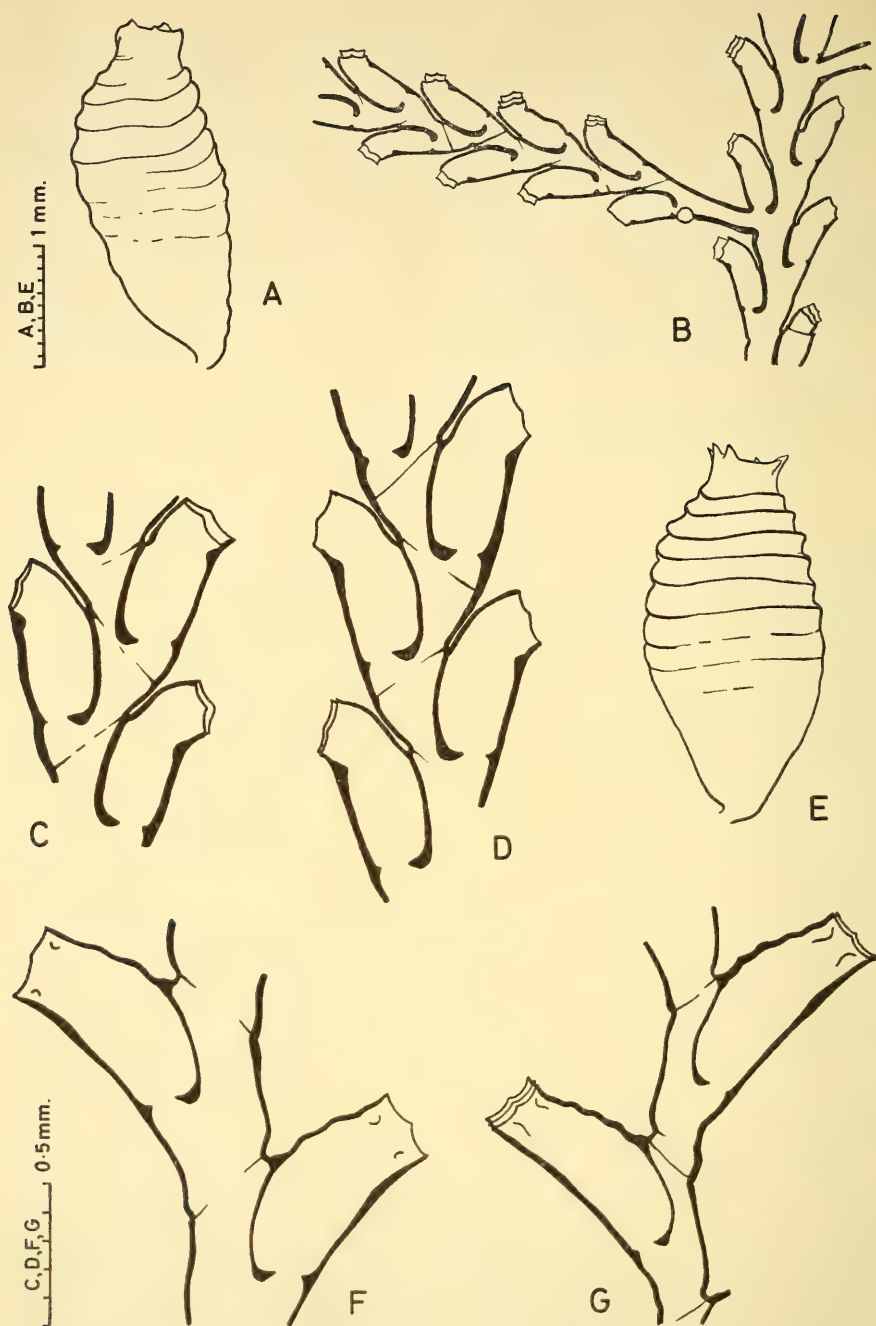
Types. Holotype: SCD 254Q (South African Museum registered number, SAMH 415). Paratype: SAMH 185. Both from South coast.

Description. Colonies reaching a maximum height of 6-7 cm. Stem stiff, thick and fascicled, giving off alternate hydrocladia, which are all in one plane. Long, fascicled branches, similar to the stem in structure, often replacing hydrocladia. Segmentation not visible in fascicled part of stem and branches, but oblique nodes usually visible in the distal, unfascicled parts (faint in holotype, distinct in paratype). One hydrotheca to each internode and one hydrocladium normally arising at the base of every third hydrotheca. Hydrothecae on stem moderately closely set, the margin of each just overlapping the base of the next on the opposite side.

Hydrocladia with nodes invisible in distal regions. Hydrothecae crowded, the margin of one often reaching half-way up the length of the next on the opposite side, and sometimes even to the base of the next on the same side. The two rows of hydrothecae in the same plane. The hydrocladium usually starts with several well-spaced hydrothecae separated by oblique nodes, and the crowding and disappearance of nodes becomes more pronounced towards the distal end.

Hydrotheca adnate for half or more of adcauline length, then bent smoothly outwards with margin tilted towards abcauline side. The sides parallel for almost entire length, though usually narrowing very slightly near margin. Marginal teeth low. No internal teeth. A pronounced perisarcal thickening present on abcauline wall below margin, and continued as an annular ridge for about half-way round hydrotheca. Margin often regenerated.

Gonotheca borne on hydrocladium and flattened against its surface, with about 8 low annulations in distal region, and with 5 short, conical, marginal spines.

FIG. 13. *Sertularella* spp.

A.-D. *Sertularella congregata* n. sp. A, gonotheca. B, portion of stem and hydrocladium. C and D, a few hydrothecae from hydrocladium.

E.-G. *Sertularella pulchra* Stechow.

(A-C from holotype, D from SAMH 185, E-F from SCD 37H, G from SAMH 219.)

Measurements (mm.)

					<i>Holotype</i>	<i>Paratype</i>
Internode length (stem)	..	..	..	..	0.40-0.42	0.35-0.46
Hydrotheca, length abcauline	..	..	..	..	0.39-0.46	0.37-0.45
length adcauline, adnate part	..	..	..	..	0.35-0.41	0.38-0.43
length adcauline, free part	..	..	..	..	0.28-0.36	0.26-0.33
adnate part/adcauline length	..	..	..	..	0.49-0.58	0.54-0.62
diameter at mouth	..	..	..	..	0.19-0.21	0.20-0.22
maximum diameter	..	..	..	..	0.24-0.27	0.25-0.27
Gonotheca (2 only), length	..	..	..	..	2.88	
maximum diameter	..	..	..	..	1.16-1.28	

Remarks. This species shows a superficial resemblance to *S. diaphana*, *S. lata*, *S. quadridens* and others, where the nodes on the hydrocladia occur at irregular intervals, and where the nodes on the stem occur after every third hydrotheca. The fundamental difference in *S. congregata* is that the nodes, when visible, occur after every hydrotheca, both on the stem and hydrocladia, but on the distal parts of the hydrocladia the nodes seem to be eliminated by the crowding of the hydrothecae. *S. congregata* also differs from *S. diaphana* in the nature of the gonotheca.

Sertularella dubia magna Millard, 1958

Fig. 14A-F

Sertularella dubia var. *magna* Millard, 1958: 189, fig. 7A.

Records. West coast: ?LAM 30L (young colony). South coast: SAMH 186, 252, 282. SCD 79J, 82L, 85C, 108G, 112C, 320K.

Description. A number of colonies, all (except LAM 30L, which is unbranched) with stiff, fascicled stems branching in one plane and in a pinnate manner.

Hydrothecae rather variable in structure and appearance—some are comparatively short and fat with well-marked abcauline thickenings as illustrated by Billard, 1907, fig. 3 and Millard, 1958, fig. 7A; others are more slender with distinct corrugations on the adcauline wall and poorly developed abcauline thickenings; and still others show a tendency for an elongation of the abcauline marginal tooth so that the margin becomes tilted towards the adcauline side. Internal hydrothecal teeth never present.

Gonotheca (not previously described) distinctly annulated in distal region, with a short terminal neck bearing 2-7 small spines (usually 5-6). Arising opposite the base of a hydrotheca. All female where the sex could be definitely ascertained. One colony (part of SCD 112C) with practically smooth gonothecae (possibly male).

Measurements (mm., excluding LAM 30L, which is a doubtful record)

Internode length	..	..	..	..	..	0.40-0.72
diameter across node	..	..	..	..	..	0.20-0.39

Hydrotheca, length abcauline	..	..	..	..	..	0.48-0.65
length adcauline, adnate part	..	..	..	..	..	0.32-0.53
length adcauline, free part	..	..	..	..	..	0.31-0.46
adnate part/adcauline length	..	..	..	..	..	0.45-0.58
diameter at mouth	..	..	..	..	..	0.22-0.30
maximum diameter	..	..	..	..	..	0.31-0.43
Gonotheca, length	..	..	..	..	..	2.67-3.94
maximum diameter	..	..	..	..	..	1.06-1.48

Remarks. The variability of the shape of the hydrotheca in this species has been the cause of some hesitation in identification, and there appear to be 3 common forms: (i) the short, fat hydrotheca with the margin tilted towards the abcauline side and a well-developed abcauline thickening, as originally described (fig. 14A, B), (ii) a longer hydrotheca with thinner perisarc and distinct adcauline corrugations (fig. 14C), and (iii) a hydrotheca with the margin tilted towards the adcauline side due to elongation of the abcauline marginal tooth (fig. 14F). These forms cannot be separated as distinct species or subspecies, as intergrading forms occur, and specimens in the same sample may vary from form (i) to form (ii), or from form (ii) to form (iii). The macroscopic appearance of the colony and the structure of the gonotheca is identical in all cases.

All the specimens described have greater dimensions than those quoted by Billard, 1907, for the nominate subspecies, and can thus be included in the subspecies *magna*. So far no overlap has been observed.

The form with adcauline thecal corrugations shows resemblances to *S. gayi* var. *robusta* Allman, 1874, but the gonothecae are different (those of *S. gayi* possessing a bilabiate aperture) and the measurements are not so great as those quoted by Billard in 1906 (p. 185) for var. *robusta*.

Some of the specimens also show resemblances to *S. crassicaulis* (Heller), but the latter species has a dichotomously branched stem.

Sertularella falsa Millard, 1957

Sertularella ?tumida: Day, Millard & Harrison, 1952: 404 (listed).

Sertularella falsa Millard, 1957: 211, figs. 10F, 11D.

Records. South coast: KNY 70F (reported by Day *et al.* 1952).

Sertularella flabellum (Allman, 1886)

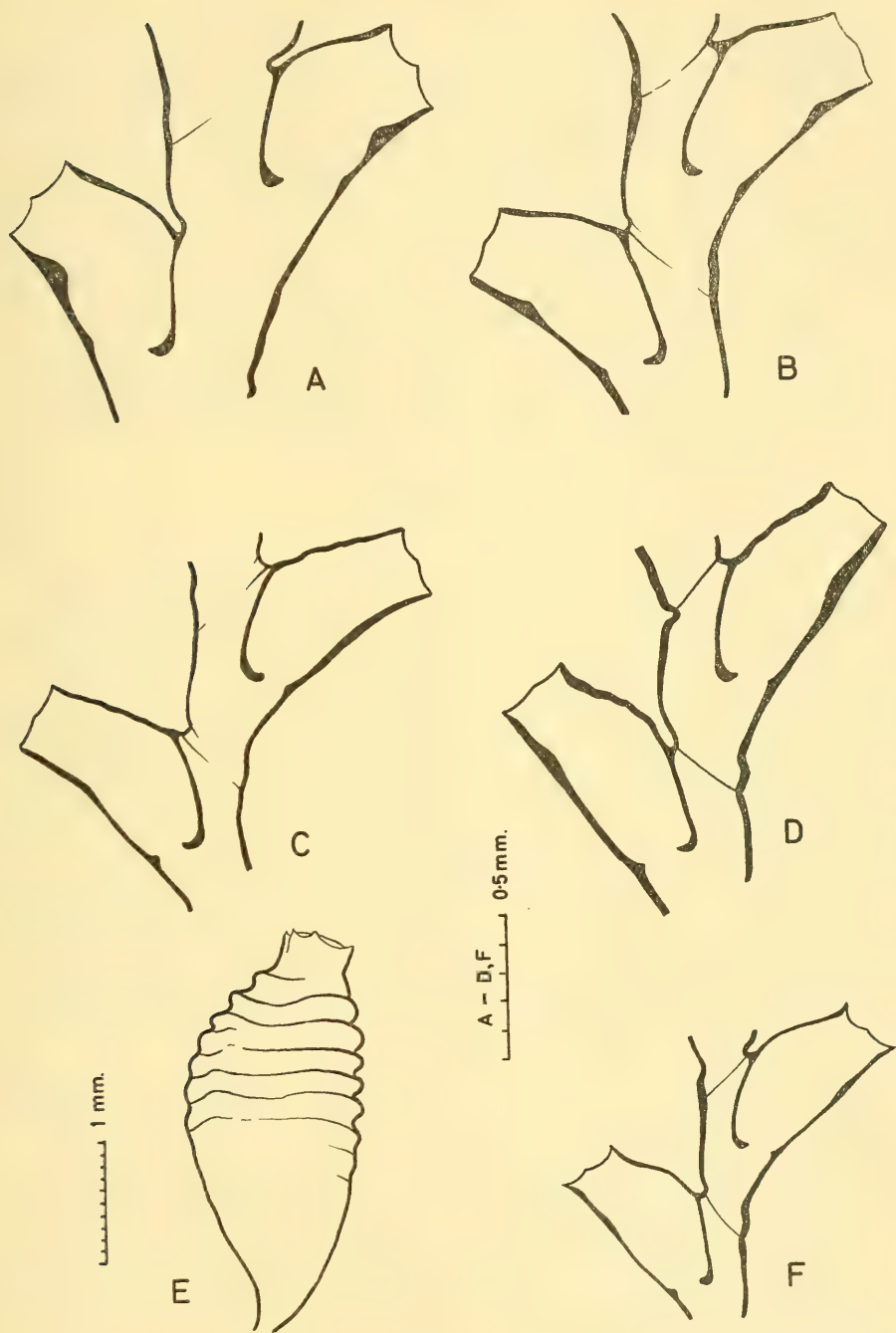
Sertularella flabellum: Millard, 1957: 212, figs. 10G, 11G. Millard, 1958: 190.

Records. West coast: TB 21D. WCD 12B. South coast: MB 47U. SAMH 171, 178, 205, 217, 263, 312. SCD 5B, 29M, 36Y, 52Q, 56S, 85E, 106P, 112B, 153S, 175J, 206N, 265K, 290S, 320J. TRA 59S, 92P, 151J.

Sertularella fusiformis (Hincks, 1861)

Sertularella ellisii f. *ellisii*: Picard, 1956: 264, fig. 3d, e.

Sertularella fusiformis: Millard, 1957: 213, figs. 10C-D, 11E.

FIG. 14. *Sertularella dubia magna* Millard.

A.-D., F. Hydrothecae from various colonies to show variation in shape.

E. Gonotheca.

(A from PF 12308H (False Bay), B from SAMH 252, C and E from SAMH 282, D from SCD 112C, F from SCD 85C.)

Records. West coast: B 105, 114B. CP 336B. PP 1S, 4M. South coast: MB 24W. SAMH 231, 271. SCD 37F, 61E, 75E.

Remarks. Picard in 1956 has included *S. fusiformis* in *S. ellisii*, but does not seem to have considered the question of the number and position of internal hydrothecal teeth. In his diagrams he shows internal teeth situated immediately below the marginal teeth, which is certainly not the case in South African material allocated to *S. fusiformis*, where internal teeth alternate with the marginal teeth. Stechow, 1923c, described *S. ellisii* as possessing 3 *small* internal teeth (thus differing from *S. mediterranea* where the teeth are large), and until more work has been done on the variability of this character. I prefer to retain *S. fusiformis* as a separate species. The number of internal teeth in the latter is known to be variable, but as has been pointed out before (Millard, 1957, p. 214; 1958, p. 187) the position in South African material at any rate is constant, and differs from that in *S. ellisii*.

Sertularella gilchristi nov. sp.

Fig. 12E, G, H.

Types and Records. Holotype: SCD 85J (South African Museum registered number SAMH 416). Other records: SCD 153X. Both from south coast.

Description of holotype. Stem thick, fascicled, reaching 5.0 cm. in height, branching and rebranching profusely in an irregular pinnate fashion, but not necessarily in one plane. General effect bushy. Terminal branches not geniculate, with distinct oblique nodes and sometimes an annulation above each node. Internodes of variable length, each with one hydrotheca.

Hydrotheca swollen below and narrowing very markedly to margin; adnate for a little less than half adcauline height; symmetrical, or (more commonly) bent outwards with margin tilted towards abcauline side; annulated, with 3 or more annulations passing all round hydrotheca or (less commonly) with annulations indistinct or confined to adcauline surface. Margin with 4 teeth, of which the abcauline one may project slightly more than the others. 3 well-developed internal teeth, 1 abcauline and 2 latero-adcauline.

Gonotheca fusiform, annulated in distal region, with 3 or 4 spines at the distal end of the slender terminal region.

<i>Measurements</i> (mm.)						<i>Holotype</i>	<i>SCD 153X</i>
Internode length	..	..	..	..	..	0.28-0.45	0.39-0.53
diameter across node	..	..	..	..	..	0.13-0.22	0.15-0.23
Hydrotheca, length abcauline	..	..	..	..	..	0.33-0.41	0.36-0.41
length adcauline, adnate part	..	..	..	..	..	0.22-0.27	0.23-0.27
length adcauline, free part	..	..	..	..	..	0.24-0.34	0.26-0.35
adnate part/adcauline length	..	..	..	..	..	0.40-0.48	0.40-0.49
diameter at mouth	..	..	..	..	..	0.11-0.14	0.12-0.13
maximum diameter	..	..	..	..	..	0.21-0.24	0.22-0.25
Gonotheca, length	..	..	..	..	..	1.84-1.86	
maximum diameter	..	..	..	..	..	0.97	

Remarks. This species shows strong resemblances to *S. robusta* Coughtrey, 1875 (see Trebilcock, 1928: 16, and Ralph, 1961: 824), but differs from it in the fascicled and freely branching stem, and also to a lesser extent in the shape of the hydrotheca which has a decidedly narrower mouth.

Sertularella goliathus Stechow, 1923

Sertularella goliathus: Millard, 1957: 215, figs. 10A, 11A.

Records. West coast: WCD 7P. South coast: SCD 106Q. TRA 37N.

Sertularella mediterranea mediterranea Hartlaub, 1901

Sertularella mediterranea: Millard, 1957: 215, figs. 10E, 11B. Hamond, 1957: 316, fig. 24. Millard, 1958: 190. Vervoort, 1959: 272, fig. 33a.

Sertularella ?gaudichaudi: Day, Millard & Harrison, 1952: 404 (listed).

Sertularella ellisii f. *mediterranea*: Picard, 1956: 264, fig. 3b.

Records. South coast: A 123, 384B. KNY 57J (recorded by Day *et al.* 1952). SAMH 206.

Sertularella mediterranea asymmetrica Millard, 1958

Sertularella mediterranea Hartlaub var. *asymmetrica* Millard, 1958: 191, fig. 7B.

Records. South coast: CPR 9D. SAMH 270. SCD 60Y.

Sertularella megista Stechow, 1923

Sertularella polyzonias f. *robusta* Kirchenpauer, 1884: 38.

Sertularella polyzonias var. *robusta*: Hartlaub, 1901: 88, pl. 5 (fig. 1). Stechow, 1925: 479.

Sertularella megista: Stechow, 1925: 480, fig. 36. Millard, 1957: 217, figs. 10L, 11J.

Records. West coast: WCD 12A, 56L. South coast: AFR 945M. MB 47V, 52H, 64J. SAMH 181, 246, 310, 316. SCD 5D, 37E, 52R, 85F, 96C, 108E, 153T, 175K, 239C, 254R, 265C, 290R, 320J.

Description. Numerous colonies from all round the coast, the tallest reaching a height of 10.3 cm. Most colonies are unfascicled and sparsely branched, and individual stems may reach a length of over 7 cm. without branching. Only the sturdiest colonies are fascicled, and these only to a small extent and in the basal region. The stems, thus, usually have a flexuous appearance, surprisingly so for a species with so thick a perisarc.

With the abundant material available it is apparent that there is great variation in length of internode and size of hydrotheca. New measurements are thus included to illustrate the range of variation in the species.

The hydrotheca is characterized by a sharp bend in the adcauline wall at the point where it separates from the stem, but the angle of the margin is influenced by the amount of bending and the length of the abcauline marginal tooth, which may be produced. Normally the margin is perpendicular to the axis, but when the bend is marked (and the angle within the hydrotheca lies between 110° and 120°) it is tilted towards the abcauline side, and when the

bend is less marked (with the internal angle over 125°) and the abcauline tooth produced it is tilted towards the adcauline side.

Measurements (mm., complete range, including False Bay material described in 1957).

Internode length	..	..	..	..	..	..	0.71-1.52
diameter across node	..	..	..	..	..	..	0.40-0.82
Hydrotheca, length abcauline	..	..	..	..	..	..	0.80-1.28
length adcauline, adnate part	..	..	..	..	..	..	0.67-1.08
length adcauline, free part	..	..	..	..	..	..	0.34-0.72
adnate part/adcauline length	..	..	..	..	..	..	0.55-0.71
diameter at mouth	..	..	..	..	..	..	0.33-0.52
maximum diameter	..	..	..	..	..	..	0.47-0.72
Mature gonotheca, length	..	..	..	..	..	..	3.33-4.03
maximum diameter	..	..	..	..	..	..	0.85-1.90

Remarks. I have included in the synonymy of this species Kirchenpauer's material of *S. polyzonias* f. *robusta* from the Cape of Good Hope. Kirchenpauer's type material unfortunately no longer exists, but was examined and illustrated by Hartlaub in 1901, and I agree with the latter author that it should be removed from *S. polyzonias*. The hydrotheca has the typical angle in the adcauline wall characteristic of *S. megista*, and the size is within range.

Sertularella polyzonias (Linn., 1758)

Sertularella polyzonias: Millard, 1957: 217, figs. 10J, 11H. Millard, 1958: 191. Millard, 1961: 205.

Records. West coast: TB 10, 12A, 21G. South Coast: MB 47W. SAMH 175. SCD 37J, 85G, 112D, 153W, 175L.

Sertularella pulchra Stechow, 1923

Fig. 13E-G

Sertularella pulchra Stechow, 1923b: 113. Stechow, 1925: 485, fig. 39.

Records. South coast: SAMH 219, 313. SCD 37H, 154L, 296J.

Description. Fascicled stems reaching a maximum height of 4.8 cm. and bearing alternate hydrocladia, which are usually very regular in arrangement, one arising below the base of every third hydrotheca. The 2 rows of hydrocladia in one plane.

Hydrothecae generally as described by Stechow, though in most colonies a few of the hydrothecae are bent gently away from the stem, with the adcauline wall slightly convex and the abcauline wall slightly concave (fig. 13 F). As a result the margin is perpendicular to the axis or tilted towards the abcauline side. Adcauline striations very obvious, and only rarely absent. 4 internal teeth, alternating with the marginal teeth, sometimes incomplete in young parts of the colony.

.. Gonothecae of 2 types. Empty ones, presumably male, as described by

Stechow, with narrow distal end and 4 marginal spines. Female similar, but with wider distal end and 5-6 short marginal spines (fig. 13 E).

						<i>Stechow's material from Simon's Bay</i>
<i>Measurements (mm.)</i>						
Internode length .. .. .	..	..	..	..	0.43-0.82	0.49-0.63
diameter across node .. ..	..	..	..	..	0.20-0.42	0.16-0.34
Hydrotheca, length abcauline ..	..	..	..	..	0.58-0.78	0.58-0.72
length adcauline, adnate part ..	..	..	..	..	0.32-0.46	0.35-0.44
length adcauline, free part ..	..	..	..	..	0.36-0.46	0.39-0.56
adnate part/adcauline length ..	..	..	..	..	0.44-0.55	0.40-0.53
diameter at mouth .. .. .	..	..	..	..	0.21-0.28	0.21-0.28
maximum diameter .. .. .	..	..	..	..	0.29-0.38	0.31-0.36
Gonotheca, length .. .. .	..	..	..	..	2.95-3.42	2.33-2.84
maximum diameter .. .. .	..	..	..	..	0.99-1.63	0.93-1.31

Remarks. I have seen two mounted slides of Stechow's material from Simon's Bay (loaned by the Munich Museum) which confirm the identity of this material. Measurements taken from Stechow's material are included above for comparison.

Stechow includes in *S. pulchra* part of Warren's material described under the name of *S. tumida* (material from Park Rynie, 1908 fig. 6B). With this I do not agree, as Warren shows no striations on the hydrothecae and only 3 internal teeth. His material can probably be included in *S. arbuscula*.

Sertularella striata Stechow, 1923

Fig. 15

Sertularella striata Stechow, 1923: 10. Stechow, 1925: 470, fig. 30.

Records. South coast: LIZ 7Z. MB 64K. SCD 85H.

Description. Stems reaching a maximum height of 1.1 cm., usually unbranched, but occasionally giving off 1 or 2 small branches which arise immediately below a hydrotheca. Details of structure and measurements as described by Stechow.

Gonotheca (not previously described) arising from stem opposite the base of a hydrotheca, annulated throughout, or with annulations becoming indistinct in basal third. Margin with 3 or 4 minute spines. Female with external marsupium.

						<i>Present material</i>	<i>Stechow's material</i>
<i>Measurements (mm.)</i>							
Internode length .. .. .	..	..	..	..	..	0.30-0.76	0.45-0.77
diameter across node .. ..	..	..	..	..	..	0.10-0.16	0.10-0.15
Hydrotheca, length abcauline ..	..	..	..	..	..	0.36-0.48	0.41-0.47
length adcauline, adnate part ..	..	..	..	..	..	0.20-0.26	0.21-0.26

length adcauline, free part	..	..	..	0.18-0.31	0.25-0.34
adnate part/adcauline length	..	..	..	0.39-0.56	0.40-0.49
diameter at mouth	..	..	..	0.15-0.21	0.17-0.23
maximum diameter	..	..	..	0.23-0.30	0.23-0.30
Gonotheca, length	..	..	..	1.35-1.79	
maximum diameter	..	..	..	0.86-0.95	

Remarks. The identity of this material was confirmed by comparison with a mounted slide of Stechow's material from the Agulhas Bank, kindly loaned by the Munich Museum. The measurements of the latter are included above for comparison.

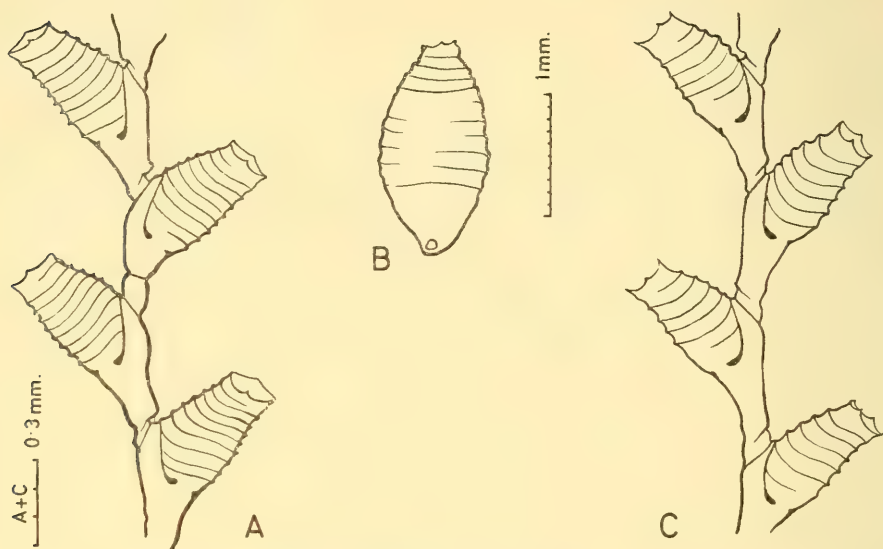


FIG. 15. *Sertularella striata* Stechow.

A. and C. Hydrothecae from different colonies.

B. The gonotheca.

(A and B from SCD 85H, C from LIZ 7Z.)

The species shows variability in the length of internode, which may be shorter or longer than that illustrated by Stechow; in the degree of annulation on the hydrothecal walls, which may be less marked; in the proportion of the adcauline thecal wall adnate to the stem; and in the angle of the thecal margin. The latter may be perpendicular to the axis as illustrated by Stechow, but may also be tilted towards the adcauline side. This is the case in some of the hydrothecae on Stechow's slide, and in most of the hydrothecae in the present material.

This species is closely related to *S. africana*, differing from it in the greater number of more distinct annulations which extend over the full length of the hydrotheca.

Sertularella xantha Stechow, 1923

Sertularella xantha: Millard, 1957: 218, figs. 10K, 11I.

Records. West coast: TB 12B. WCD 30U. South coast: SAMH 146, 154, 220, 325, 334, 348. SCD 33C, 103E, 104E, 108F, 113F, 114F, 115N, 122W, 126K, 141J, 145B, 184Q, 191R, 219W, 239D, 258P, 276T, 290Q, 322G, 324J, 345A. TRA 33L, 35A, 38B, 42E, 56V, 92T.

Sertularia distans gracilis Hassall, 1848

Sertularia heterodonta Ritchie, 1909: 79, fig. 4. Jarvis, 1922: 339.

Sertularia distans var. *gracilis*: Billard, 1925: 175, fig. 33. Leloup, 1935: 47, figs. 28, 29. Millard, 1957: 221, fig. 12. Millard, 1958: 193. Pennycuik, 1959: 197.

Records. South coast: BRE 60R. CPR 7C. LIZ 13E. MB 24R. SAMH 266. SCD 37Y, 50M, 85Q, 112E.

Description. A number of colonies, none taller than 0.8 cm., all with unbranched stems, except in a few instances where side-branches arise from within hydrothecae. Distance between consecutive pairs of hydrothecae very variable, and internodes sometimes very long and slender, as illustrated by Ritchie, 1909, for *S. heterodonta*. Internal pegs of perisarc in lower part of hydrotheca very characteristic, and internal teeth in distal region below margin also common—1 abcauline (fairly common), or 1 abcauline and 2 latero-adcauline (more rare and in occasional hydrothecae only).

Gonothecae present in 2 colonies, as illustrated by Leloup, 1935; female with external marsupium.

Remarks. Examination of Ritchie's type material of *S. heterodonta* (on loan to the British Museum) showed that this species is distinguished from the common form of *S. distans gracilis* only by the presence of 3 internal hydrothecal teeth, longer and more slender internodes, and slightly smaller hydrothecae. The last 2 characters can be attributed to variations in growth-form which are paralleled in the South African material. The presence of a single abcauline internal tooth has been reported in *S. distans gracilis* by a number of authors, and the presence of 2 extra latero-adcauline internal teeth (which were not present in all the hydrothecae of the type material) is here reported in South Africa. I therefore include *S. heterodonta* Ritchie as a synonym for *S. distans gracilis*.

Sertularia marginata (Kirch., 1864)

Sertularia marginata: Millard, 1957: 224, fig. 13. Ralph, 1961: 785, fig. 12a-g (synonymy).

Records. South coast: SCD 305D.

Description. A young colony consisting of 5 stems reaching a maximum height of 0.6 cm., of which one bears 1 branch, another 2, and the rest are simple.

Sertularia turbinata (Lamx., 1816)

Sertularia loculosa: Bale, 1884: pl. 4 (figs. 5, 6), pl. 9 (fig. 12), pl. 19 (fig. 9). Bale, 1913: 121, pl. 12 (figs. 7, 8). Warren, 1908: 306, fig. 8. Jarvis, 1922: 340.

Sertularia brevicyathus: Nutting, 1904: 60, pl. 6 (figs. 1, 2). Jarvis, 1922: 338, pl. 24 (fig. 6).

Tridentata acuta Stechow, 1921: 231. Stechow, 1923c: 207.

Sertularia turbinata: Billard, 1925: 177, fig. 34. Millard, 1958: 197, fig. 8B. Vervoort, 1959: 275, figs. 35, 36.

Sertularia restricta Totton, 1930: 205.

Sertularia acuta: Millard, 1958: 192, figs. 8A, F.

Records. South coast: MB 58E. SCD 85S.

Description. Two small colonies reaching a maximum height of 0.7 cm. One of them (MB 58E) is an old colony with thick perisarc and smoothly worn hydrothecal margins; the whole surface is thickly overgrown with epiphytes. In both colonies the nodes tend to be indistinct, particularly near the proximal end of a stem.

Remarks. Up to the present time *S. acuta* (Stechow) has been held to be separate from *S. turbinata* (Lamx.), although Billard (1925: 178), was dubious about the matter, remarking that the former species differs from the latter only in the shorter internodes, and in the shorter hydrothecae which narrow more abruptly to the margin.

The two samples in this collection are intermediate between the material of *S. acuta* and *S. turbinata* previously described (Millard, 1958) in internode length and abcauline thecal length, and the 4 samples together form a perfect gradation from one extreme to the other. It is thus no longer possible to keep the two species separate, and *S. acuta* must be considered as a somewhat stunted growth-form of *S. turbinata*. Selected measurements (in mm.) of the 4 samples are included for comparison:

	Internode length	Hydrotheca, length abcauline	Hydrotheca, diameter at margin
RHB 52C	0.39-0.54	0.16-0.21	0.09-0.12
SCD 85S	0.52-0.62	0.19-0.22	0.09-0.11
MB 58E	0.55-0.76	0.22-0.32	0.13-0.16
PZ 13B	0.66-0.85	0.25-0.31	0.12-0.17

In all 4 samples the hydrotheca is very similar in appearance, and grades evenly from the form illustrated for *S. acuta* (Millard, 1958: fig. 8A) to that of *S. turbinata* (Millard, 1958: fig. 8B).

The gonothecae of *S. turbinata* have now been described by Vervoort (1959: fig. 36 b, c) and are exactly similar to those of *S. acuta* (Millard, 1958: fig. 8F; Warren, 1908: fig. 8D), except for the presence of 2 minute distal spines in the former.

It was previously thought (Millard, 1958: 198) that the nature of the nodes was a distinguishing character between *S. acuta* (straight) and *S. turbinata* (oblique). But the new material has shown that this is a variable character and the nodes may be straight, oblique or invisible, and further that both straight and oblique nodes may occur on the same stem. This is discounting the hinge-joints, which always form the termination of an extra athecate internode and which occur quite irregularly.

S. turbinata is closely related to *S. ligulata* Thornely, and the difference between them is largely one of shape, which is obvious to the eye, but which is not shown up at all clearly by the measurements, due mainly to the tendency for variation between the proximal and distal regions of a stem in both species. In *S. ligulata* the members of a pair of hydrothecae are more erect and tend to diverge at a higher level than in *S. turbinata*. As a result the hydrothecae of the former are in general contiguous and adnate for a greater length, and the maximum diameter across a pair tends to be less. *S. ligulata* also has a slightly wider thecal mouth and lower marginal teeth (Millard, 1958: figs. 8B, 9A, B). If these 2 species are to be kept separate, the presence of a ligula in *S. ligulata* cannot be used as a specific character, as it is also clearly evident in a mounted specimen of *S. turbinata* (MB 58E). As a rule specimens are not sufficiently well preserved to determine the presence or absence of this character.

Symplectoscyphus arboriformis (Markt., 1890)

Sertularella arboriformis Marktanner-Turneretscher, 1890: 228, pl. 4 (fig. 5). Stechow, 1912: 358, fig. C.

Records. West coast: SAMH 409. WCD 81L. South coast: SAMH 156, 172, 184, 207, 311, 317. SCD 5C, 37D, 61C, 75C, 138K, 290T. TRA 92Q.

Description. Colonies reaching a maximum height of 11.0 cm., some with gonothecae. Structure agreeing perfectly with Marktanner's description.

<i>Measurements</i> (mm.)						<i>Stechow's material</i>
Internode length	0.60	0.80	0.51	0.78		
diameter across node	0.17	0.33	0.19	0.42		
Hydrotheca, length abcauline	0.34	0.47	0.46	0.63		
length adcauline, adnate part	0.31	0.40	0.28	0.43		
length adcauline, free part	0.38	0.46	0.35	0.50		
adnate part/adcauline length	0.42	0.51	0.36	0.53		
diameter at mouth	0.28	0.38	0.25	0.35		
Gonotheca, length	1.35	1.92	1.46	1.75		
maximum diameter	0.71	0.96	0.81	0.96		

Remarks. Two slides of Stechow's material from Algoa Bay were examined by courtesy of the Munich Museum. The measurements are included above for comparison.

Symplectoscyphus macrogonus (Treb., 1928)

Sertularella macrogona Trebilcock, 1928: 11, pl. 1 (fig. 4).

Symplectoscyphus macrogonus: Millard, 1957: 219. Ralph, 1961: 798, fig. 14 a, b.

Records. West coast: BB 13P. CP 379, 650B. LAM 2G, 7M, 9T, 13J, 14S, 18L, 23M, 30K, 35E, 40P, 41G, 46M, 59B. PP 1U. SB 150D, 161Y, 194L, 253D. TB 11, 21F. WCD 81J, 100T. South coast: BMR 23N. SAMH 265. SCD 179C.

Thyroscyphus aequalis Warren, 1908

Fig. 16

Thyroscyphus ramosus: Billard, 1907: 342.*Thyroscyphus aequalis* Warren, 1908: 344, pl. 48 (figs. 38-40), fig. 23. Jarvis, 1922: 337. Millard, 1958: 199.*Thyroscyphus regularis*: Ritchie, 1910: 811, pl. 77 (fig. 7). Jäderholm, 1923: 5. Stechow, 1925: 463.*Cnidoscyphus aequalis*: Spletstösser, 1929: 82, 124, figs. 78-82. Kramp, 1947: 13.

Records. South coast: SAMH 173, 251, 268, 350, 379. SCD 29L, 37A, 61D, 79L, 84J, 94F, 117J, 153R, 169X, 254S, 265D. TRA 23B, 35D, 38D, 56T, 92A.

Description. Numerous samples, some consisting of a few fragments only, the largest reaching 40 cm. in height. Stem weakly fascicled at base in larger colonies only, branching in an irregularly alternate manner. Nodes distinct or only faintly indicated. Hydrotheca-bearing apophysis without basal septum. Hydrothecal pedicel about half width of apophysis, spirally annulated to a varying degree, often regenerated.

Hydrotheca of rather variable shape and size, usually expanding to margin and practically symmetrical, but often with narrower mouth and slightly bulging adcauline wall. Margin with 4 teeth and perisarcal thickening below edge. Diaphragm in form of annular thickening of perisarc, which is better developed on adcauline side and often invisible on abcauline side. An internal ridge of perisarc sometimes present about one-third of height of hydrotheca for attachment of annular fold of hydranth. Two batteries of large rod-shaped nematocysts present in ectodermal lining of hydrotheca in adcauline and abcauline position respectively.

Gonotheca (male) elongated, widening towards distal extremity, which is obliquely truncated, smooth or roughly corrugated. Containing one large gonophore, which is extruded into an external marsupium when mature.

Measurements of hydrothecae (mm.). Samples in which typical nematocyst batteries could be recognized indicated by *.

					Height from diaphragm	Diameter at mouth	Diameter height
TRA 35D*	..	..	..	..	1.05-1.21	0.90-0.99	0.74-0.92
TRA 38D ..	..	..	..	..	1.05-1.21	0.76-0.99	0.72-0.82
(AFR 1028.O.A ..	..	..	..	..	0.78-1.01	0.65-0.77	0.69-0.86)
TRA 23B* ..	..	..	..	..	1.07-1.28	0.80-1.13	0.68-0.98
SAMH 173*	..	..	..	..	1.01-1.28	0.83-0.93	0.68-0.92
SAMH 350*	..	..	..	..	0.92-1.25	0.76-0.90	0.62-0.93
(NAD 1W* ..	..	..	..	..	1.00-1.02	0.61-0.74	0.61-0.73)
SCD 29L* ..	..	..	..	..	0.79-1.00	0.55-0.75	0.58-0.93
SCD 37B ..	..	..	..	..	0.83-1.05	0.44-0.64	0.47-0.64
From Jarvis ..	..	..	..	..	0.85-0.9	0.75	0.83-0.88
From Jäderholm ..	..	..	..	..	1.1-1.2	0.9	0.75-0.82

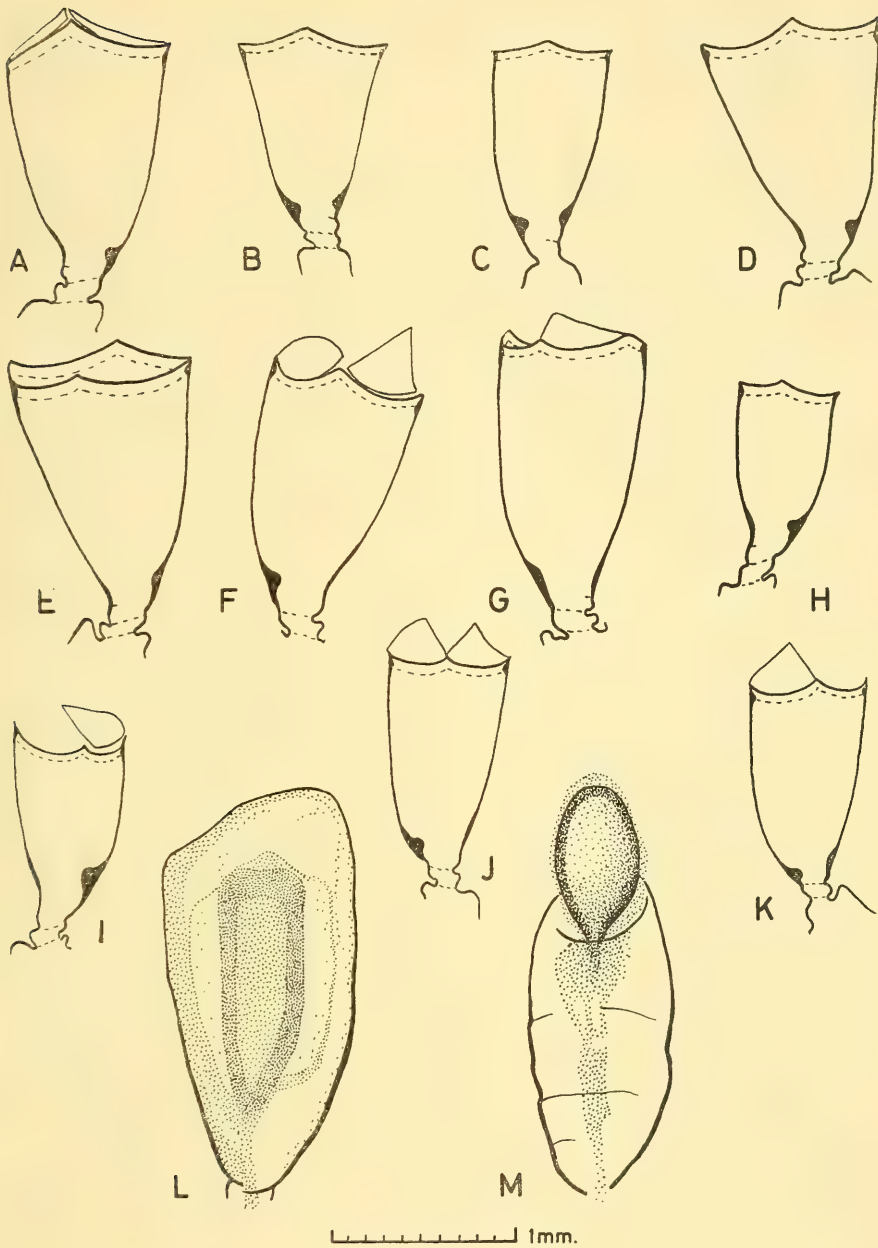


FIG. 16. *Thyrosocyphus aequalis* Warren.

A.-K. Hydrothecae and pedicels from various colonies to show variation.

L.-M. Male gonothecae, M with an external marsupium.

(A from TRA 35D; B and C from AFR 1028.O.A (Natal); D and E from TRA 23B; F and L from SAMH 173; G from SAMH 350; H, I and M from SCD 29L; J and K from SCD 37A.)

From Splettstösser	0.8-1.15	0.75-0.92	
From Warren	1.18	0.79	0.67
From Ritchie	0.96	0.63	0.66
From Stechow	0.96	0.60	0.62

Remarks. *T. aequalis* is closely related to *T. torresi* (Busk) and according to Splettstösser and Kramp the latter is distinguished from the former by (i) the presence of a perisarcal septum at the base of the hydrothecal apophysis, (ii) the presence of a single battery of large nematocysts situated in the 'Deckelplatte' rather than in the ectodermal lining of the hydrotheca, (iii) the shape of the hydrotheca which has a narrower mouth and somewhat protruberant adcauline wall, and (iv) the hydrothecal pedicel which is not annulated.

In none of the South African material is there a septum at the base of the apophysis, and in all specimens where nematocysts are preserved the batteries are arranged as described by Warren, apparently indicating that all the material is conspecific. Yet there is so much variation in the shape and size of the hydrotheca and in the nature of the pedicel that it appears that characters (iii) and (iv) are of less systematic value than previously supposed (see fig. 16).

The shape of the hydrotheca varies from a large form with a wide mouth and practically symmetrical sides to a smaller form with a narrower mouth and protruberant adcauline wall (see diameter/height ratios above), but all intermediate stages are present and nowhere can a definite dividing line be placed between the two forms. Sometimes both forms occur in the same sample. A similar variation is evident in the literature among records assigned by Splettstösser to *Cnidocyphus aequalis*; thus, the material of Jarvis and Jäderholm belongs near the top of the series and that of Stechow near the bottom.

The hydrothecal pedicel in *T. aequalis* is said to be 'annulated'. This annulation, when well developed, is due to the presence of a groove running spirally around the pedicel and completing a maximum of $2\frac{1}{2}$ turns, usually with half a turn more on the abcauline than on the adcauline side. However, the development of this groove varies considerably (and often within the same colony), and many pedicels would come into the category of 'not annulated' (fig. 16 C). The amount of annulation bears no relation to the size and shape of the hydrotheca, but may possibly be related to the age, as there is a tendency for more distinct annulation in older parts of the colony. In old colonies, however, the spiral grooving is usually obscured by successive regenerations of the pedicel which are marked by deep transverse septa across its width.

The gonotheca, of which only the male has been observed, is similar to that described by Ritchie, and is unique among male hydroids for the extrusion of the sexual products into an external marsupium.

SUMMARY

In the three families of hydroids considered here, a total of 50 species is recorded from the south and west coasts of South Africa. Of these 12 belong to the family Lafocidae, 4 to the Syntheciidae and 34 to the Sertulariidae.

6 new species are described, namely *Hebella urceolata*, *Zygophylax enigmatica*, *Salacia disjuncta*, *Sertularella agulhensis*, *Sertularella congregata* and *Sertularella gilchristi*, and one new subspecies, namely *Sertularella capensis delicata*. 7 of the other records are new to South Africa.

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SYNONYMY

Arranged according to chronology of names. Published scientific names by which a species has been previously designated (subsequent to 1758) are listed in chronological order, with abbreviated bibliographic references to descriptions or citations following in chronological order after each name. Full references must be given at the end of the paper. Articles and recommendations of the *International code of zoological nomenclature adopted by the XV International congress of zoology, London, July 1958*, are to be observed (particularly articles 22 and 51).

Examples: *Plonia capensis* Smith, 1954: 86, pl. 27, fig. 3. Green, 1955: 23, fig. 2.

When transferred to another genus:

Euplonia capensis (Smith) Brown, 1955: 259.

When misidentified as another species:

Plonia natalensis (non West), Jones, 1956: 18.

When another species has been called by the same name:

[non] *Plonia capensis*: Jones, 1957: 27 (= *natalensis* West).

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